Megabit Modem

Megabit Modem 410F and 420F User Manual

Version 3.1.x

ADC

Copyright

January 2001

©Copyright 2001 ADC DSL Systems, Inc. All Rights Reserved.

Trademark Information

ADC is a registered trademark of ADC Telecommunications, Inc.

Megabit Modem is a registered trademark of PairGain Technologies, Inc. All Rights Reserved. No right, license, or interest to such trademarks is granted hereunder, and you agree that no such right, license, or interest shall be asserted by you with respect to such trademark.

Other product names mentioned in this practice are used for identification purposes only and may be trademarks or registered trademarks of their respective companies.

Disclaimer of Liability

Information contained in this document is company private to ADC DSL Systems, Inc., and shall not be modified, used, copied, reproduced or disclosed in whole or in part without the written consent of ADC.

Contents herein are current as of the date of publication. ADC reserves the right to change the contents without prior notice. In no event shall ADC be liable for any damages resulting from loss of data, loss of use, or loss of profits, and ADC further disclaims any and all liability for indirect, incidental, special, consequential or other similar damages. This disclaimer of liability applies to all products, publications and services during and after the warranty period.

ABOUT THIS USER MANUAL

Use this manual to install and configure the Megabit Modem 410F and 420F. This manual provides instructions on:

- information you will need to configure the modems

- unpacking and inspecting the modems for installation

- installing the modems

- setting up parameters for your applications that will be used to configure the modems

- configuring system parameters

- configuring the connection between the Megabit Modem 410F and 420F

- monitoring and troubleshooting the modems

Chapter 9 provides a reference for technology implemented in the Megabit Modem 410F and 420F. The chapter covers information about Asymmetric Digital Subscriber Line (ADSL), rate adaptive transmission, the bridging/routing operating mode, and Simple Network Management Protocol (SNMP) management.

IP addresses used in this manual are for example only. You will acquire your own addresses from your information services coordinator to configure the Megabit Modem 410F and 420F. You will, however, use the IP address specified in "Accessing the Modem Web Pages" on page 34 to access the Megabit Modem 410F and 420F from a Web browser.

DOCUMENT CONVENTIONS

Two types of messages, identified by icons, appear in the text.

Notes contain information about special circumstances.

Cautions indicate the possibility of equipment damage or the possibility of personal injury.

PRODUCT CERTIFICATIONS

FCC

Megabit Modem 410 and 420F

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

UL

The Megabit Modem 410F and 420F meet all safety requirements per UL-1950 and cUL standards.

CE

The Megabit Model 420F meet all EMC and safety requirements per EN 300 386-02 and IEC 950.

TABLE OF CONTENTS

ABOUT THE PRODUCT 1

The Megabit Modem® 410F and 420F use Asymmetric
Digital Subscriber Line (ADSL) technology and Discrete
MultiTone (DMT) line coding to provide a multi-megabit
connection between the two modems using a single-pair
telephone line. The Megabit Modem 410F and 420F are
designed to be used together, one at each end of a circuit,
with model 410F functioning as the ATU-C and model
420F functioning as the ATU-R.
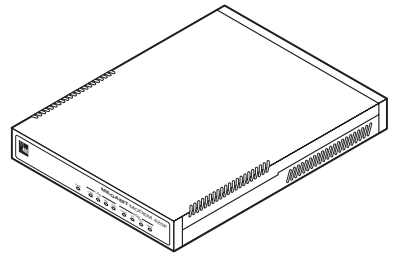
The Megabit Modem 410F and 420F support the full DMT rate of 7.552 Mbps downstream and
928 kbps upstream. The Megabit Modem 410F and 420F can be used in fixed rate mode or in
rate adaptive mode. In rate adaptive mode, the modem sychnronizes at the maximum attainable
data rate depending on distance and line condition.

The Megabit Modem 410F and 420F are easy to install and configure. To install each modem:

- connect a telephone cable from the modem to a wall phone jack that is wired for ADSL
  service

- connect a cable from the modem to a PC or an Ethernet hub for LAN service

- connect a power cable to a local power source

To configure each modem, launch a Web browser on your PC and access the Megabit Modem
Configuration and Management Tool Web pages. Use the Web pages to configure the LAN,
WAN, and ADSL connection; configure other system parameters; and monitor ADSL, LAN,
WAN, and other networking functions. Or, you can access the modems through a PC connected
to the modem RS-232 management port and then use the Megabit Modem Setup Menu to
configure the modem parameters (these are a subset of the parameters that can be configured
using the Megabit Modem Configuration and Management Tool Web pages).

LEDs on the modem front panel provide continual status at-a-glance for network and modem
connections.

FEATURES

The Megabit Modem 410F and 420F provide:

- fixed-rate or rate-adaptable ADSL transmission downstream at up to 7.552 Mbps and upstream at up to 928 kbps

- Dynamic Host Configuration Protocol (DHCP) server to provide network configuration information including IP addresses to LAN devices

- Trivial File Transfer Protocol (TFTP) for software upgrades

- AccessGain™ software that provides access through an HTTP server to configure, manage, and monitor the modem through a Web-based interface from the LAN or WAN port

- SNMP agent for management through any industry standard SNMP platform from the LAN or WAN port

- autosensing 10/100BASE-T Ethernet port for connection to the LAN

- LEDs that provide continual status at-a-glance for power, LAN, and ADSL connections

Chapter 9, "Technical Reference" on page 67 provides more information about the technologies implemented in the Megabit Modem 410F and 420F.

APPLICATIONS

Use the Megabit Modem 410F and 420F for:

- remote access to private networks, for example, telecommuting
- point-to-point LAN extension, for example, connecting a remote network to a central site

Telecommuting Application
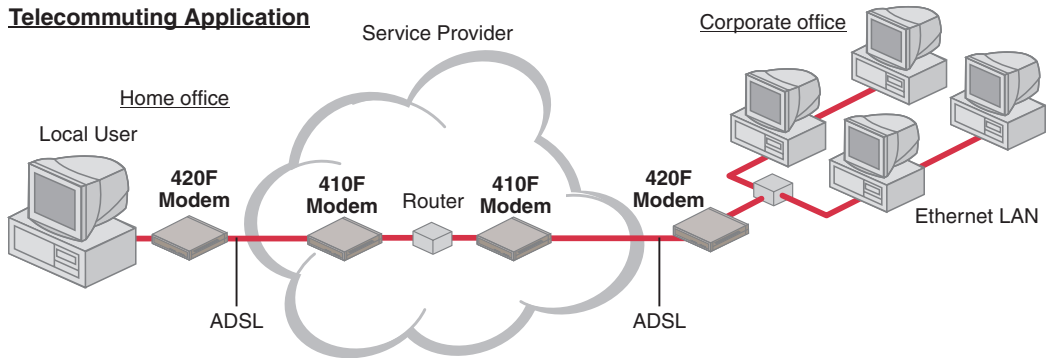
LAN Extension Application
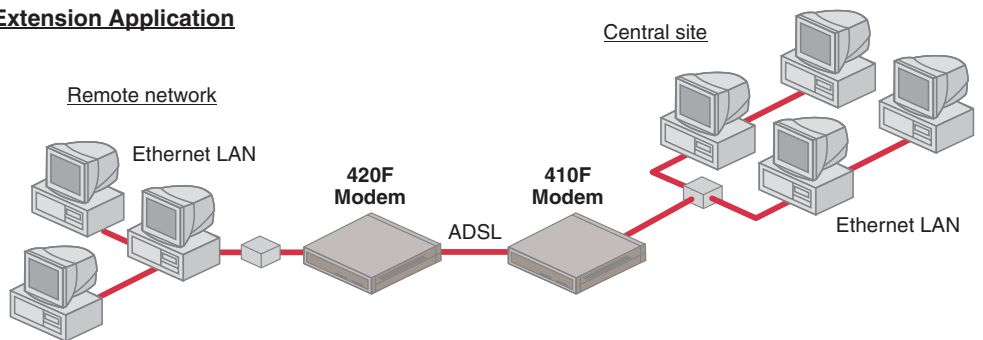
WHAT YOU NEED TO START 2

This chapter identifies the preparations and prerequisites for installing the Megabit Modem 410F and 420F. Install the Megabit Modem 410F (ATU-C) at one end of the circuit and a Megabit Modem 420F (ATU-R) at the other end. To install each modem, verify that:

- the contents of the package are accurate as described on this page

- your system meets requirements for connecting to and configuring the modem (see "Requirements for your System" on page 6)

- your facility meets installation site requirements (see "Requirements for the Installation Site" on page 6)

- you have made the choice for the power option for the modem (see "Power Cable Options" on page 9)

VERIFY PACKAGE CONTENTS

As you unpack the Megabit Modem 410F or 420F, visually inspect the container for signs of damage. If the equipment was damaged in transit, report the damage to the transportation company and to the sales representative.

Check the contents of the package for the Megabit Modem 410F or 420F and the following:

- one black cable

- one grey phone cord

- four rubber, self-adhesive feet

- two screws

- power supply and optional power cord (see "Power Cable Options" on page 9 for options)

- grey cable and DB-9 console port adapter
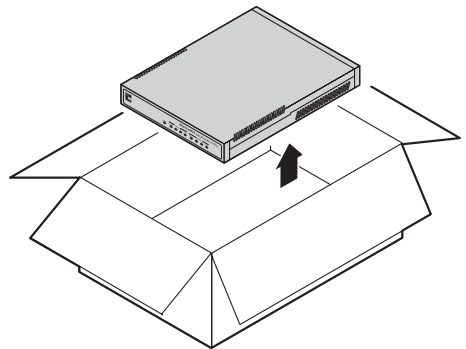
If you need to store the modem for a prolonged period, store it in the original antistatic bag and packaging. Observe environmental specifications as stated on .

REQUIREMENTS FOR YOUR SYSTEM

You need the following hardware and software to complete the installation and configuration of the Megabit Modem 410F or 420F:

- PC with an Ethernet Network Interface Card (NIC)

- TCP/IP network protocol stack (see the documentation for your operating system)

- Web browser installed such as Netscape® or Internet Explorer® Version 4.0 or higher

- Ethernet hub (optional)

REQUIREMENTS FOR THE INSTALLATION SITE

You must select the locations to install the Megabit Modem 410F and 420F. You can install modems either:

- placed on a flat surface (shown on)

- mounted on a wall (shown on)

Your facility must have the following minimum site requirements to install each modem:

- power outlet

- RJ-11 wall jack with DMT ADSL service (you provide)

Flat-Surface Mount

> ⚠️ **Do not stack the modems when installing on a flat surface. The modems do not dissipate heat properly when stacked.**

Place the modems on a flat surface, such as on a table or in a rack.

Minimum
1-inch clearance

Minimum
1-inch clearance
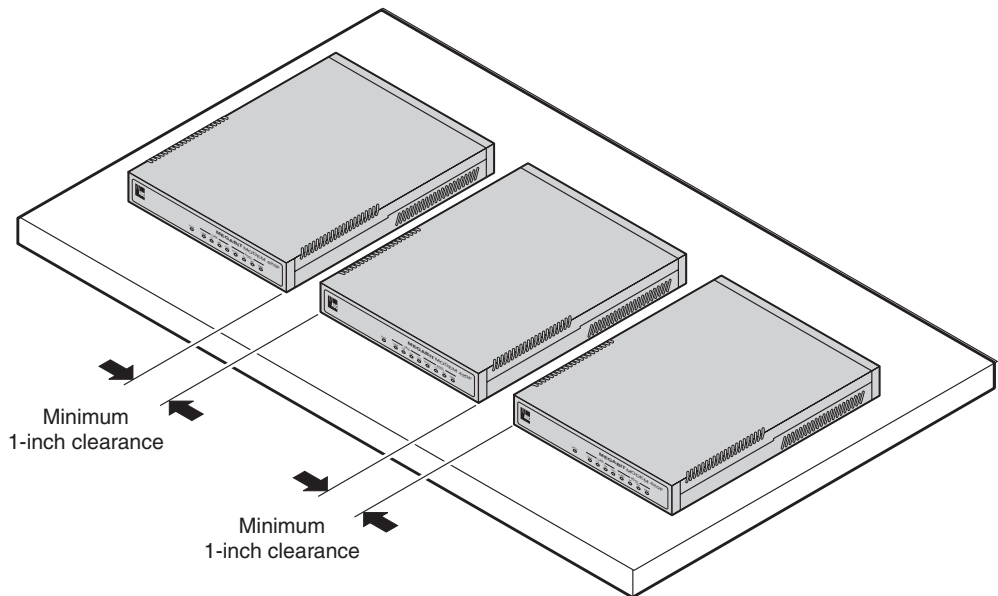
Wall Mount

Ensure the minimum dimensions (shown in the illustration) for spacing between the modems are met to allow for heat dissipation, viewing of front panel LEDs, and cabling.

Mount the modems on a wall using the hardware included in the installation kit. Observe the minimum dimensions between multiple modems (shown in the illustration) to ensure sufficient ventilation for heat dissipation.
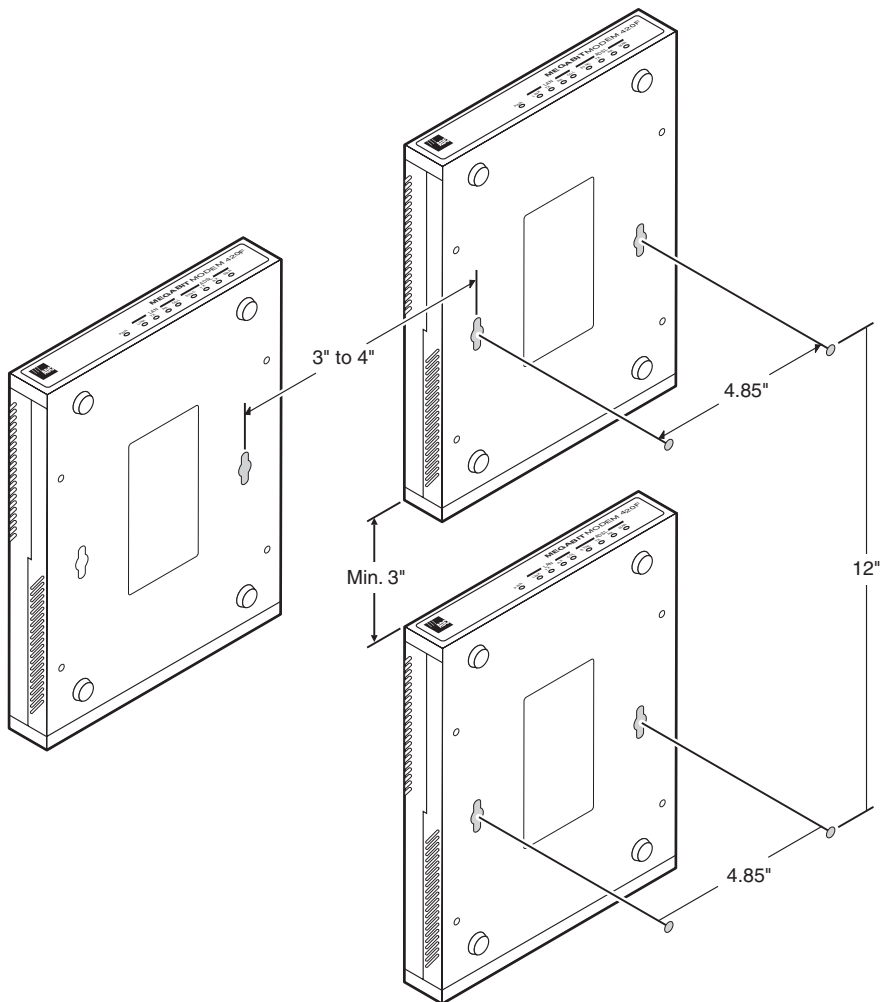
POWER CABLE OPTIONS

The Megabit Modem 410F and 420F are available with a variety of power supplies and power cords. The product part numbers are as follows:

Megabit Modem 410F is 150-2129-7*x*

Megabit Modem 420F is 150-2128-7*x*

When you order your modems, choose one of the following as the last number of the product part number for your order to indicate which power cable option you need:

- *2* indicates a power supply for International use and does not include a power cord.

- *3* indicates a power supply for North American use and includes a North American power cord.

- *4* indicates a Universal power supply and includes a European power cord.

- *5* indicates a Universal power supply and includes a UK/Ireland power cord.

INSTALLING THE MEGABIT MODEM 410F AND 420F

3

The Megabit Modem 410F and 420F are easy to install by:

- attaching adhesive-backed feet

- setting the MDI/MDI-X switch

- connecting a cable from the modem to a PC or an Ethernet hub for LAN service

- connecting a phone cord from the modem to a wall phone jack for DMT ADSL Internet or other types of WAN services

- connecting a power cable to a local power outlet

- powering up and checking LEDs

Perform the installation described on the following pages (see "Requirements for the Installation Site" on page 6 to determine where to place modems). Use the parts listed below in the installation procedures.

Part	Function
Rubber feet (four)	Attaches to the base of the modem.
Black cable	Connects the modem 10/100BASE-T connector to the LAN through a hub or to a PC NIC.
Grey cord	Connects the modem ADSL connector to the RJ-11 wall jack with DMT ADSL service for access to the Internet or other types of WAN applications.
Power cable	Connects the modem POWER connector to the local power source. Power supply optionally has a power cord. (See "Power Cable Options" on page 9 for selection options.)
Grey cable and adapter	Connects the RS-232 management port to an ASCII terminal or a PC running terminal emulation software. The adapter assembly connects to a DB-9 connector on the PC. One RJ-45 connector installs in the adapter and the other connector into the console port on the modem.

ATTACHING THE FEET

Attach each of the four adhesive-backed rubber feet to a footprint recess on the bottom of the modem.

Rubber feet

Recess
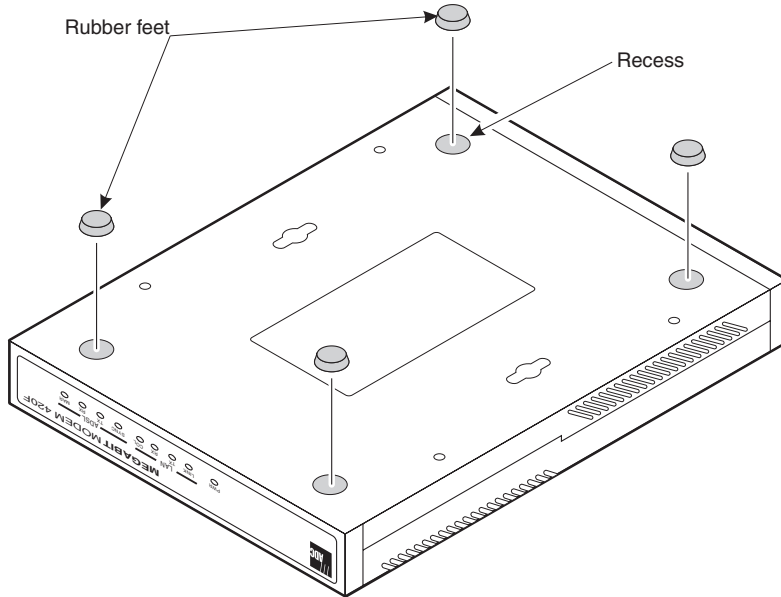
MEGABIT MODEM 420F

SETTING THE MDI/MDI-X SWITCH

Using the MDI/MDI-X switch, the Megabit Modem 410F and 420F can communicate with a device on the LAN that is either MDI or MDI-X without having to change the cable (a straight-through cable is supplied with the installation kit).

Set the switch for the 10/100BASE-T port to:

- MDI-X when you are connecting to a device with an MDI port such as a PC with an Ethernet NIC

- MDI when you are connecting to a device with an MDI-X port such as a hub, repeater, bridge, or router
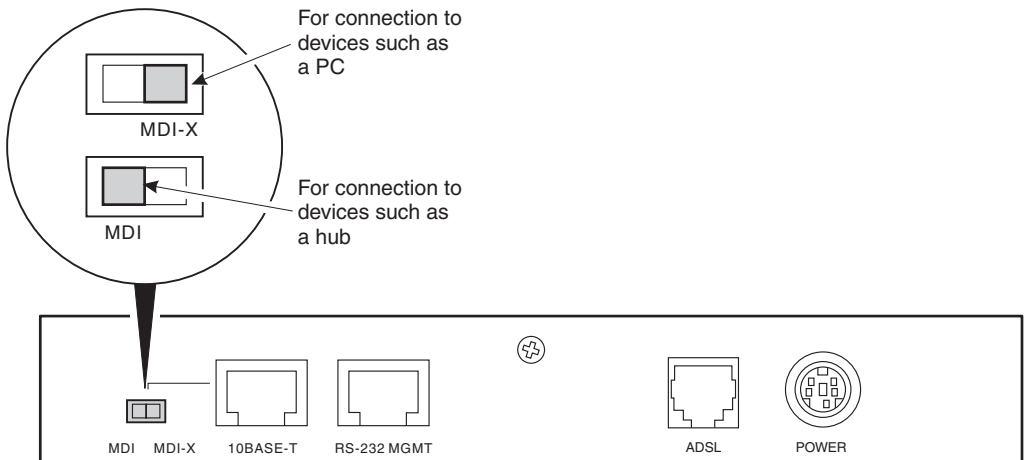
INSTALLING CABLING

Install the cables:

- the black cable for the 10/100BASE-T LAN connection

- the grey phone cord for the ADSL port WAN connection

- the power cable to the modem power connector then to the facility power outlet (cable specified on)
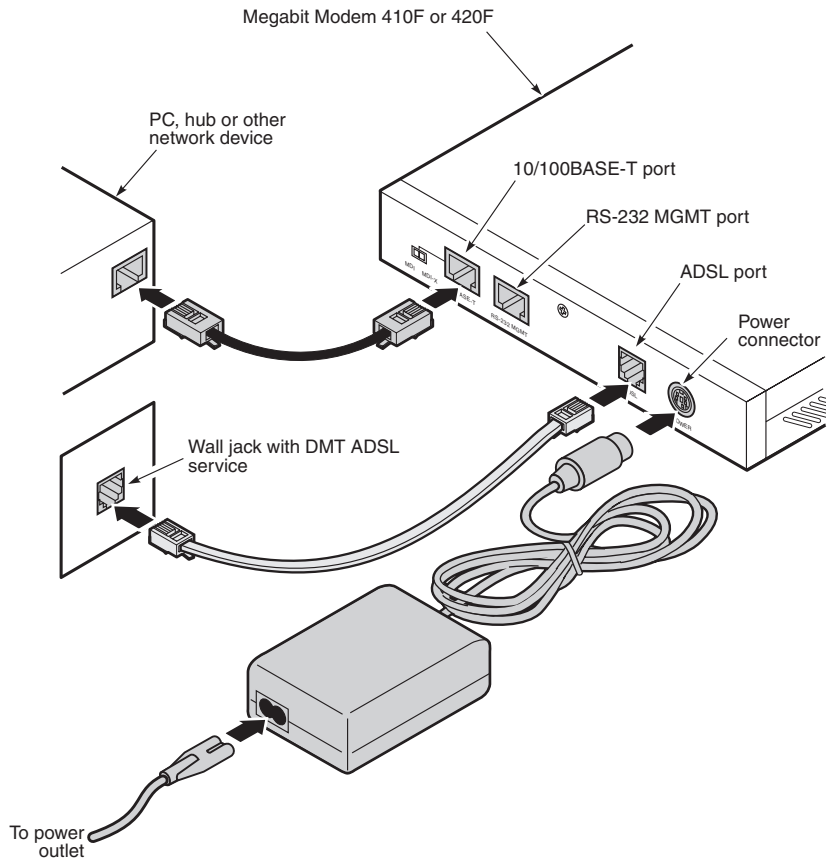
The following table shows the signal on each pin for the ADSL port. The connector for this interface is an RJ-11.

Pin	Signal
1	Not used
2	Not used
3	Ring
4	Tip
5	Not used
6	Not used

The following table shows the signal on each pin when the switch is in either the MDI or the MDI-X position for the 10/100BASE-T port. The connector for this interface is an RJ-45.

MDI	MDI-X	Signal	Description
1	3	TX+	Transmit Data (+)
2	6	TX-	Transmit Data (-)
3	1	RD+	Receive Data (+)
4	4	Not used	Not used
5	5	Not used	Not used
6	2	RD-	Receive Data (-)
7	7	Not used	Not used
8	8	Not used	Not used

Powering Up and Checking LEDs

Once you have completed the steps described in the previous sections for the Megabit Modem 410F and 420F, you are ready to power up each modem.

1 Plug the Megabit Modem 410F and 420F power supplies into the facility power and ensure the Power LED is lit solid green.

2 Allow the modems approximately 30 to 60 seconds to synchronize.

3 After both modems are powered up, verify the following LED indications on each modem:

- LAN LINK LED is solid green (when the Ethernet port is connected)

- ADSL SYNC LED is solid green when the Megabit Modem 410F synchronizes with the Megabit Modem 420F (the LED flashes green when synchronization is lost between the two modems)

- ADSL MAR LED is solid green if the margin is at or above the configured **Margin Threshold** (see page 53)

If conditions other than those listed above exist, check the cabling. See "Installing Cabling" on page 14 for instructions.

The illustration and table on page 17 describe LED indications for all operational modes. LEDs on the modem front panel provide continual status at-a-glance for network and modem connections.

Status LEDs
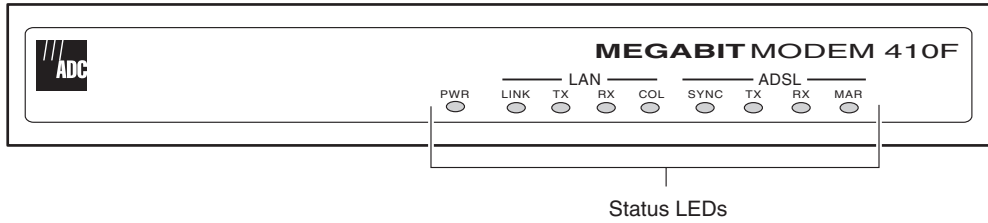
LED	State	Description
PWR	On green	Modem has power.
	Off	Modem does not have power.
LAN		
LINK	On green	A PC, hub, or other network device is connected to the modem 10/100BASE-T interface.
	Off	No device is connected to the modem 10/100BASE-T interface.
TX	Flashing green	Modem is transmitting data to devices on the LAN.
	Off	Modem is not transmitting data to the LAN.
RX	Flashing green	Modem is receiving data from devices on the LAN.
	Off	Modem is not receiving data from the LAN.
COL	Flashing green	Collision detected on the 10/100BASE-T link.
	Off	No collision detected.
ADSL		
SYNC	On green	ADSL transceiver is synchronized and in normal operation mode.
	Flashing green	ADSL transceiver is in a start-up sequence.
	Off	ADSL modem transceiver is not detecting a transceiver at the far end.
TX	Flashing green	Modem is transmitting data to the other modem.
	Off	Modem is not transmitting data to the other modem.
RX	Flashing green	Modem is receiving data from the other modem.
	Off	Modem is not receiving data from the other modem.
MAR	On green	ADSL margin is at or above the configured **Margin Threshold** (see page 53).
	Off	ADSL margin is below the configured **Margin Threshold**.

CONNECTING THE PC TO THE RS-232 PORT

Connecting the PC to the RS-232 port is an optional procedure. However, if you use the recommended configuration for the modem, you will initially set up parameters using this interface.

1   Connect the modem to a PC as shown below.
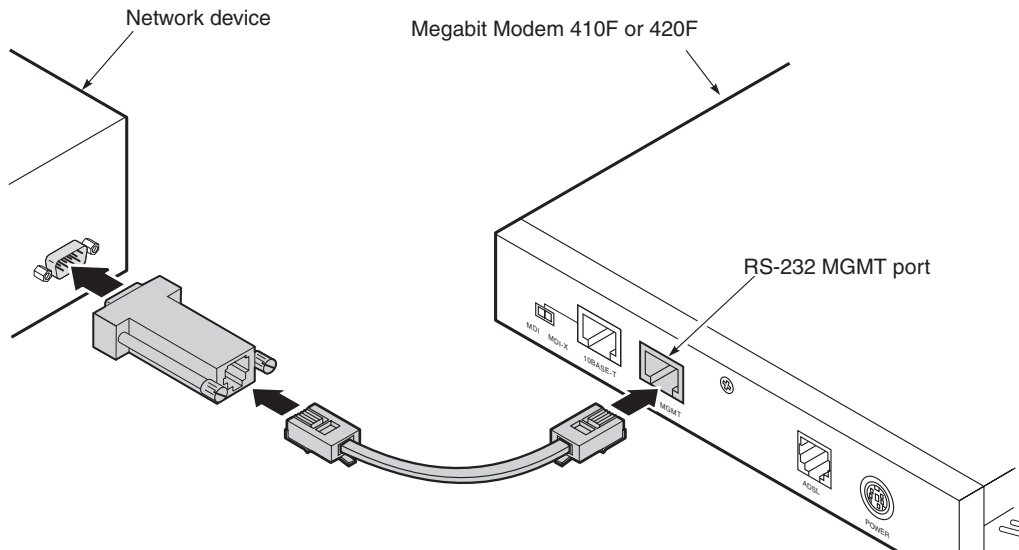
2   Configure these communication settings (if using terminal emulation, select ANSI):

- 9600 baud

- no parity

- 8 data bits

- stop bit

- flow control off

The following table shows connector pin assignments for the 8-pin RS-232 port connector.

Pin	Signal	Signal Direction
1	Not Used	-
2	Receive Data (RD)	Modem to terminal
3	Transmit Data (TD)	Terminal to modem
4	Data Terminal Ready (DTR)	Terminal to modem
5	DGND	-
6	Data Set Ready (DSR)	Modem to terminal
7	Not Used	-
8	Not Used	-

3 Display the Megabit Modem Setup Menu.

SETTING UP FOR CONFIGURATION 4

You can configure and manage the modem through the RS-232 management port, the Web pages, or SNMP (Simple Network Management Protocol). Through SNMP and the Web pages, you can fully configure and manage the modem. Through the RS-232 management port, you can configure the modem through a reduced set of parameters. The following is the recommended way to set up the modem:

- Determine the IP addresses and subnet masks for LAN and WAN ports, as applicable (page 22).

- Initially, use the RS232-management port (page 24) to:

  - configure IP addresses and subnet masks for the LAN and WAN ports (both ports have a default IP address and subnet mask)

  - enable DHCP if you want the modem to serve IP addresses to devices on the LAN (the default for DHCP is disabled)

  - set up parameters for bridging and routing

- Then, configure other parameters, such as system configuration, and manage the modem through either the Web pages or SNMP. You will configure ADSL parameters by accessing the Megabit Modem 410 only.

  When you configure and manage the Megabit Modem 410 and 420 through the Web pages, set up a PC and a Web browser using the set up procedures provided in this chapter. Then, learn how you can access and navigate the Megabit Modem 410F and 420F Web pages.

DETERMINING IP ADDRESSES FOR THE SUBNET

If you have not already done so, you need to determine the IP addresses and subnet masks for the Megabit Modem 410F and 420F and each device on their LANs. This will enable you to configure and manage the modems from the 10/100BASE-T LAN port or ADSL (WAN) port, as well as transmit information to and receive information from devices throughout the system.

How to set the IP addresses and subnet masks for the Megabit Modem 410F and 420F and the devices on their LANs depends upon whether you configure the system for bridging, routing, or bridging and routing mode.

Managing Modems in Bridging Mode

The following is a sample configuration for setting the IP addresses and subnet masks for managing modems when bridging mode only is enabled. Note that in bridging mode, the 410F LAN and 420F LAN must be on the same IP subnet. When you connect to a modem either locally or remotely, use the modem 10/100BASE-T LAN port IP address.

> **The IP addresses in the figure below are for example only. Acquire your own IP addresses from your network administrator or service provider.**
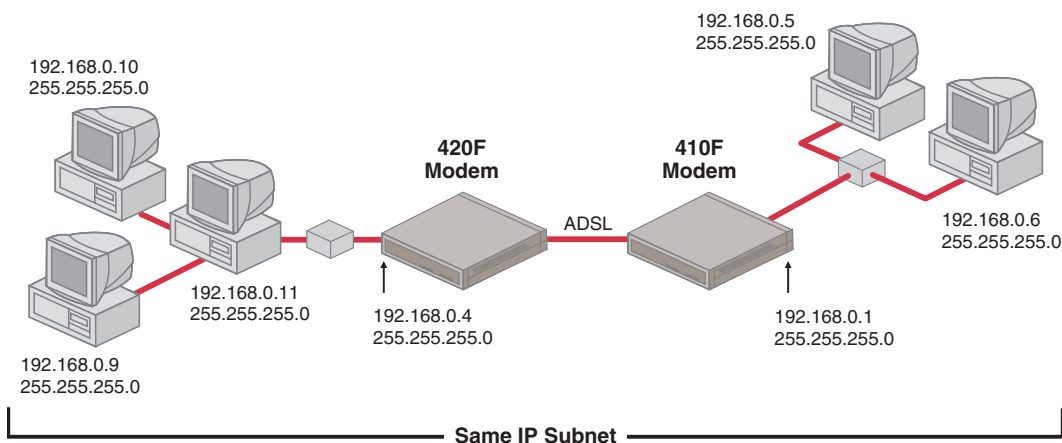
Managing Modems in Routing or Bridging/Routing Mode

The following is a sample configuration for setting the IP addresses and subnet masks when only routing mode or both routing mode and bridging mode are enabled. Note that there must be three IP subnets: 410F LAN, 420F LAN, and the 410F to 420F ADSL (WAN). When you connect to a modem either locally or remotely, use either the modem 10/100BASE-T LAN port or ADSL (WAN) port IP address, respectively.

The IP addresses in the figure below are for example only. Acquire your own IP addresses from your network administrator or service provider.

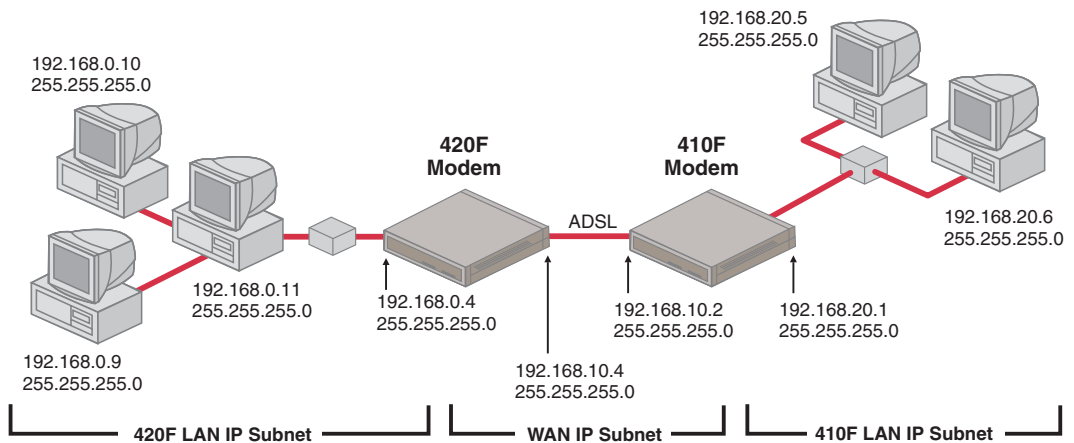The default IP address for the 10/100BASE-T LAN port is 192.168.0.1 and the IP subnet mask is 255.255.255.0. If you want to view or change the default IP address for the modem, see "Using the RS-232 management Port for Set Up" on page 24 for instructions.

USING THE RS-232 MANAGEMENT PORT FOR SET UP

You can configure some parameter for the Megabit Modem 410F and 420F modems through the RS-232 port that is connected to a PC. You can use the Megabit Modem Setup Menu to do the following:

- manually change the LAN and WAN IP address and network mask

- enable Dynamic Host Configuration Protocol (DHCP)

- configure modem parameters (these are a subset of the parameters that can be configured using the Megabit Modem 410F and 420F Web pages)

```
Pairgain Megabit Modem 410F Setup Menu

========================================================

BSP version:              2.2

SW version:               2.8

========================================================

(1)Enter LAN IP address:                192.168.0.1

(2)Enter LAN IP network mask:           255.255.255.0

(3)Toggle Bridging:                     Enabled

(4)Toggle Routing:                      Disabled

(5)Toggle LAN DHCP:                     Disabled

(6)Toggle Spanning Tree:                Enabled

(7)Enter WAN IP address:

(8)Enter WAN IP network mask:

(9)Toggle LAN RIP:                      Enabled

(10)Toggle WAN RIP:                     Enabled

(11)Enter default gateway IP address:   0.0.0.0

(12)Enter IP Admin address:             0.0.0.0

(13)Set Factory Defaults

(14)Reset modem

>
```

Basic information about the modem automatically displays when you access the Setup Menu.

The Megabit Modem model (410F or 420F) that you are managing or configuring. You are using either the Megabit Modem 410F Setup Menu or the Megabit Modem 420F Setup Menu.

The BSP version on your modem. The version shown on page 24 is for example only.

The SW (software) version on your modem. The version shown on page 24 is for example only.

Enter any of the parameters at the prompt. For more information about the LAN and WAN parameters—options (1) through (11)—see "Configuring the LAN and WAN" on page 48.

:

(1)   Type `1` then enter the LAN IP address for the modem Ethernet 10/100BASE-T LAN port. The default IP address for the LAN port is 192.168.0.1.

(2)   Type `2` then enter the LAN IP network mask (subnet IP mask) for the modem Ethernet 10/100BASE-T LAN port. The default IP subnet mask is 255.255.255.0.

(3)   Type `3` then enter y to toggle the bridging setting. Select bridging enabled to forward Ethernet data based on MAC addresses.

(4)   Type `4` then enter y to toggle the routing setting. Select routing enabled to forward IP datagrams based on IP addresses.

(5)   Type `5` then enter y to toggle the LAN DHCP setting. This option is available only when routing is enabled. When routing is not enabled, LAN DHCP is disabled.

Select LAN DHCP enabled so that the modem will act as a DHCP server, automatically assigning IP addresses to devices on the LAN. If you select DHCP, ensure that all devices on the LAN have the TCP/IP stack set to **obtain an IP address automatically** (see "Setting Up the PC to Access the Modem Web Pages" on page 27).

(6)   Type `6` then enter y to toggle Spanning Tree. Select Spanning Tree enabled to implement Spanning tree when bridging is enabled.

(7)   Type `7` then enter the WAN IP address for the ADSL (WAN) port. This option is available only if routing is enabled. When routing is not enabled, the field is blank.

(8)   Type `8` then enter the WAN IP network mask (subnet IP mask) for the ADSL (WAN) port. This option is available only if routing is enabled. When routing is not enabled, the field is blank.

(9)   Type **9** then enter y to toggle LAN RIP to select the direction you want RIP (Routing Information Protocol) activated in routing mode. Select enabled to activate both RIP directions (incoming and outgoing) in routing mode. Select disabled to not activate RIP.

(10)   Type **1** **0** then enter y to toggle WAN RIP to select the direction you want RIP (Routing Information Protocol) activated in routing mode. Select enabled to activate both RIP directions (incoming and outgoing) in routing mode. Select disabled to not activate RIP.

(11)   Type **1** **1** then enter the default gateway IP address for the modem to access other LAN segments or IP addresses not in its routing table.

(12)   Type **1** **2** then enter the IP address (which is the address of the router to which the modem may forward packets) for a device on the LAN or WAN that will manage the modem. To allow any device on the LAN or WAN to manage the modem, enter 0.0.0.0. For more information, see "Configuring the Admin IP Address" on page 46.

(13)   Type **1** **3** then enter y to return the parameters to the factory default values. This returns all parameters to the default values, not only the subset of parameters that you can configure using the Megabit Modem Setup Menu. For more information, see "Resetting the Modem to Factory Defaults" on page 39.

> **When you type 13 then enter y to return to factory default values, the modem automatically resets.**

(14)   Type **1** **4** then enter y to reset the modem after you change the WAN and LAN IP address and the IP network mask. You must reset the modem to effect these changes.

SETTING UP THE PC TO ACCESS THE MODEM WEB PAGES

To configure and manage your Megabit Modem 410F and 420F F using the Web pages, you must set up your PC for access. You can set up in one of two ways:

- when DHCP is disabled (default) for the modem, enter a static IP address for your PC that is on a subnet that can access the modem LAN port, as described on page 27

- when DHCP is enabled for the modem, the PC and other devices on the LAN automatically obtain an IP address from the modem, as described on page 29

Setting Up a Static IP Address for the PC

When DHCP is disabled on the modem, set the TCP/IP configuration for the PC to **Specify an IP address**. Then, enter an IP address for the PC NIC card that is on a subnet that can access the modem (see "Determining IP Addresses for the Subnet" on page 22).

See the example on page 28 for setting up the PC to obtain an address when using Microsoft Windows® 95. If you use an operating system other than Windows 95, refer to the appropriate operating system user documentation.

1   Open the **Control Panel** window and double-click on the **Network** icon shown at right.

2   In the **Network** dialog (shown on page 28), double-click **TCP/IP** under the **Configuration** tab (or highlight **TCP/IP** then click **Properties**).

3   On the **IP Address** tab, select **Specify an IP address.**

4   Enter an IP address and subnet mask for the PC, then click **OK**.

**5**   Restart the PC to effect the new settings.
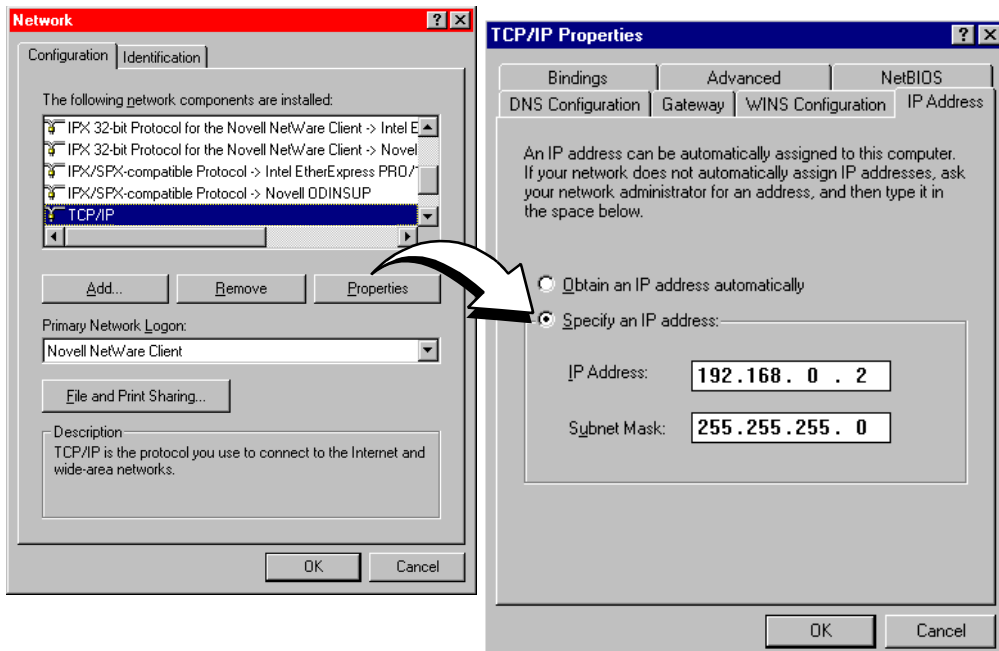
Obtaining a Dynamic IP Address for the PC

When DHCP is enabled, the modem can provide an IP address dynamically to devices on the LAN. If you enabled DHCP when you set up the modem in "Using the RS-232 management Port for Set Up" on page 24, ensure that the TCP/IP configuration for your PC and other devices on the LAN is set to automatically obtain the IP address from the modem.

See the example below for setting up the PC to obtain an address when using Microsoft Windows® 95. If you use an application other than Windows 95, refer to the appropriate operating system user documentation.

1. Open the **Control Panel** window and double-click on the **Network** icon shown at right.

2. In the **Network** dialog (shown below), double-click **TCP/IP** under the **Configuration** tab (or highlight **TCP/IP** then click **Properties**).

3. On the **IP Address** tab, select **Obtain an IP address automatically,** then click **OK**.

4. Restart the PC to effect the new settings.
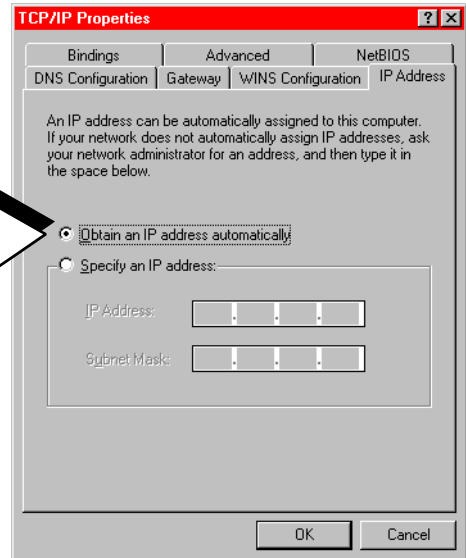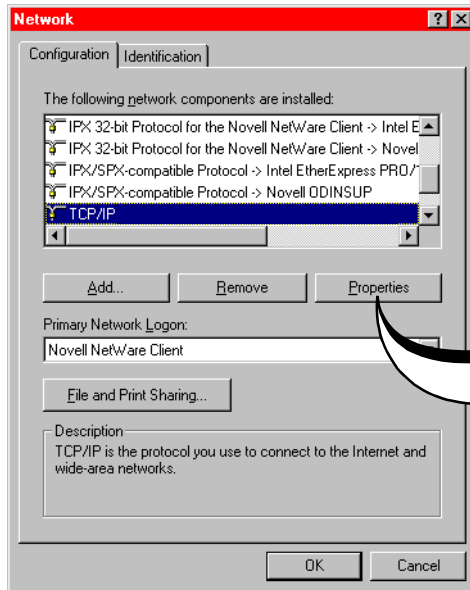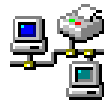
# SETTING UP A WEB BROWSER TO ACCESS THE MODEM WEB PAGES

To access the Megabit Modem 410F or 420F Web pages through a Web browser (see for Web browser versions supported), the Web browser must have these settings:

- Proxies disabled (see this page for Netscape or for Internet Explorer)

- frequency to automatically update the Web page with current information selected (see for Netscape or for Internet Explorer)

Disable Proxies

Disable the Proxies for Netscape:

1 Open the Web browser.

2 Select **Edit**, **Preferences**, **Proxies**.

3 Select **Direct connection to the Internet**.

4 Click **OK.**
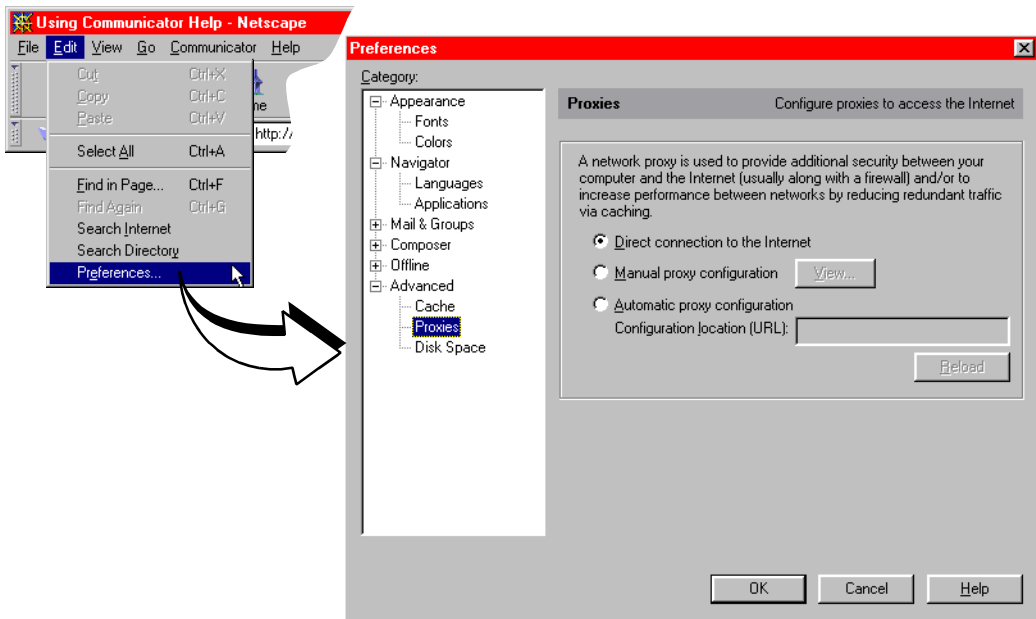
Disable the Proxies for Internet Explorer:

1   Open the Web browser.

2   Select **View**, **Internet Options**, and then **Connection** tab.

3   Select **Connect to the Internet using a local area network.**

4   Ensure **Access the Internet using a proxy server** is not selected.

5   Click **OK.**
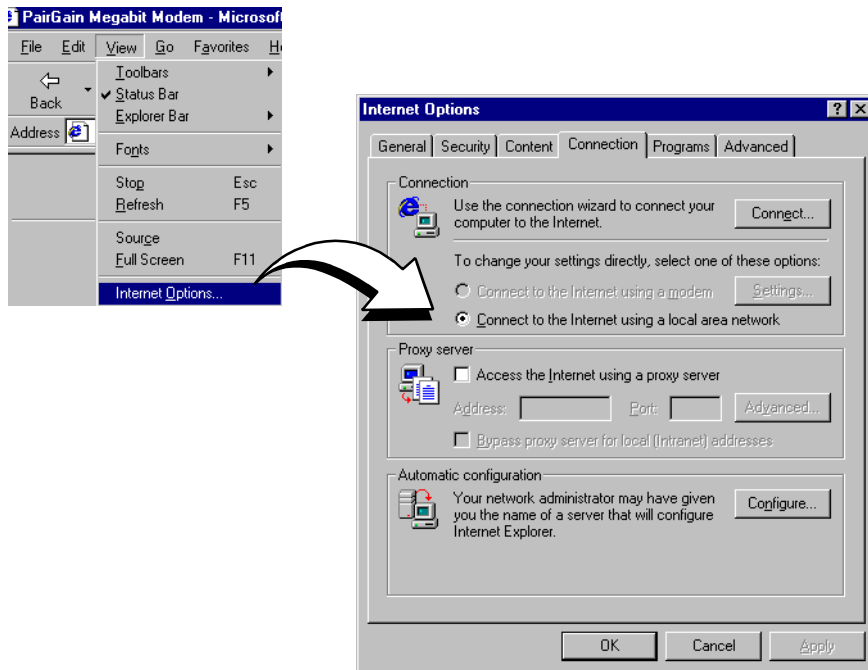
Set the Web Page Update Frequency

Set the Netscape Web page for update frequency:

1 Open the Web browser.

2 Select **Edit**, **Preferences**, and then **Cache**.

3 Select **Every time** under **Document in cache is compared to document on network:**.

4 Click **OK**.
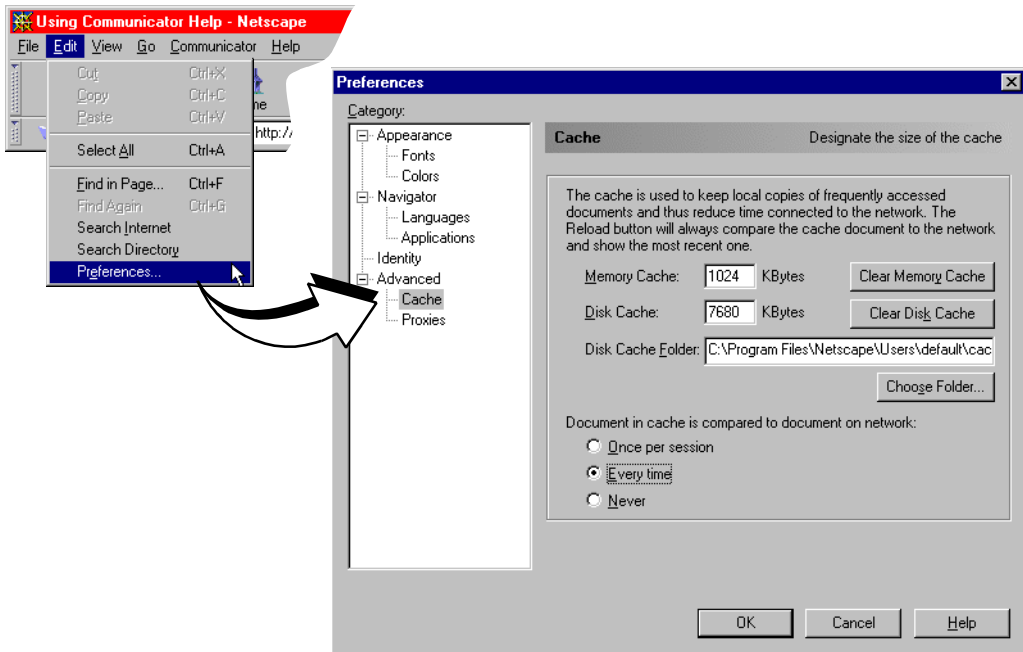
Set the Internet Explorer Web page for update frequency:

1   Open a Web browser.

2   Select **View**, **Internet Options**.

3   Select the **General** tab, and select **Settings** under **Temporary Internet files.**

4   Select **Every visit to the page** under **Check for newer versions of stored pages:**.

5   Click **OK.**
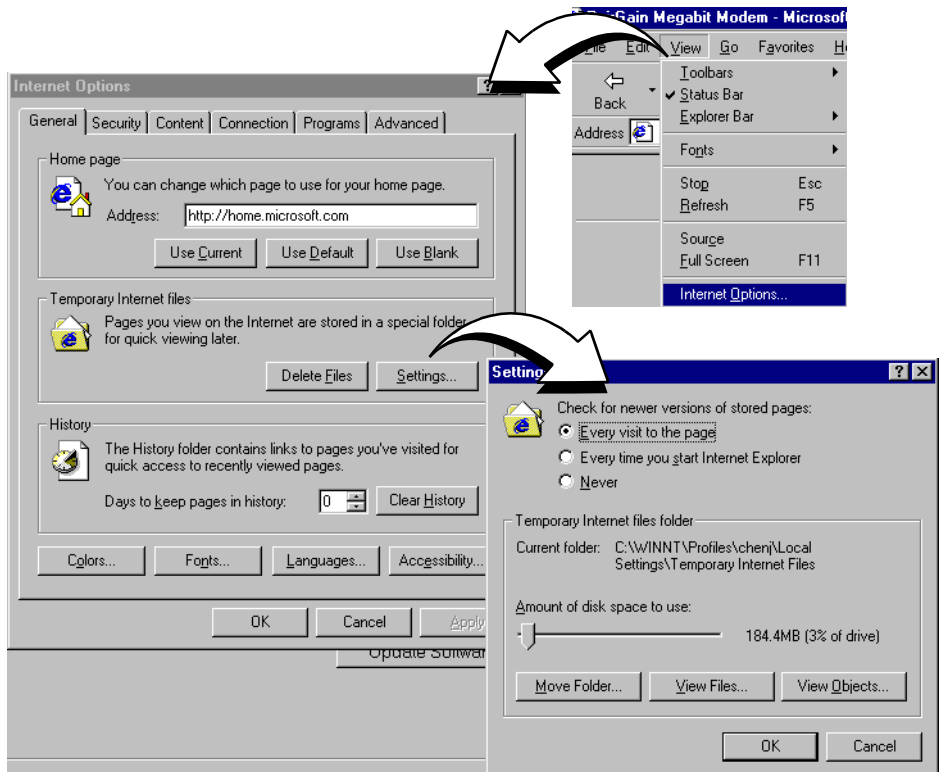
ACCESSING THE MODEM WEB PAGES

Type **http://192.168.0.1** in the **Location Bar** field of the Web browser (as shown below), then press **ENTER** . 192.168.0.1 is the default IP address for the modem 10/100BASE-T LAN port and is a private address specified for use by RFC 1918. If you changed the LAN IP address through the RS-232 management port (page 24), enter the new IP address in the **Location Bar** instead of 192.168.0.1.

If the Megabit Modem 410F and 420F have routing or bridging/routing mode enabled, you can also access the Web pages through the WAN IP address of the modem. You can set up the WAN IP address through the RS-232 management port (page 24). Enter the WAN IP address in the **Location Bar**.

Location Bar
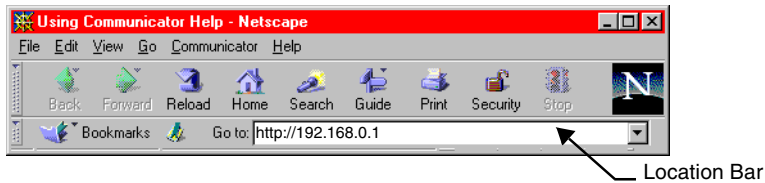
The Megabit Modem 410F and 420F Web pages display with two primary frames:

- Frame A contains the navigation menus. Use the menus to select the configuration or management page you want to view in Frame B.

- Frame B displays the configuration or management page associated with the menu item you selected from the navigation menu in Frame A.

Frame A   Frame B
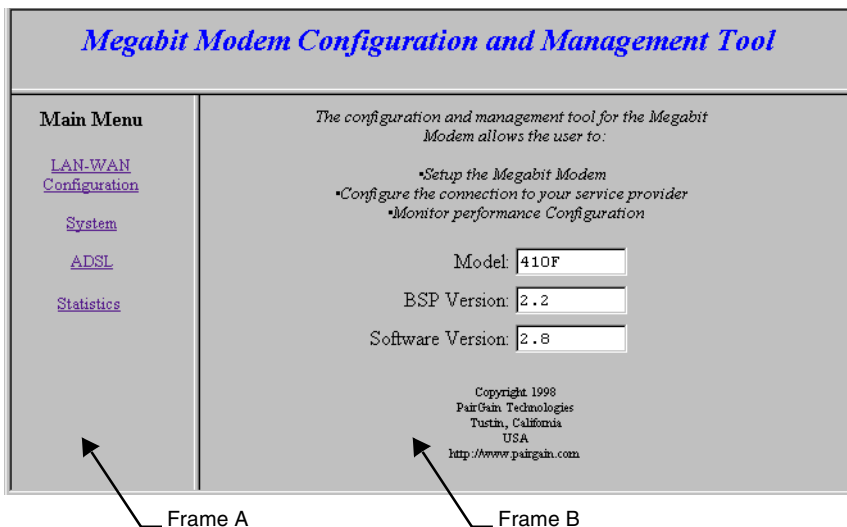
VIEWING MODEL AND SOFTWARE VERSIONS

The modem model, BSP version, and software version automatically display when you access the Megabit Modem 410F or 420F Web pages, or when you select **Main** to return to the **Main Menu** from the other menus.
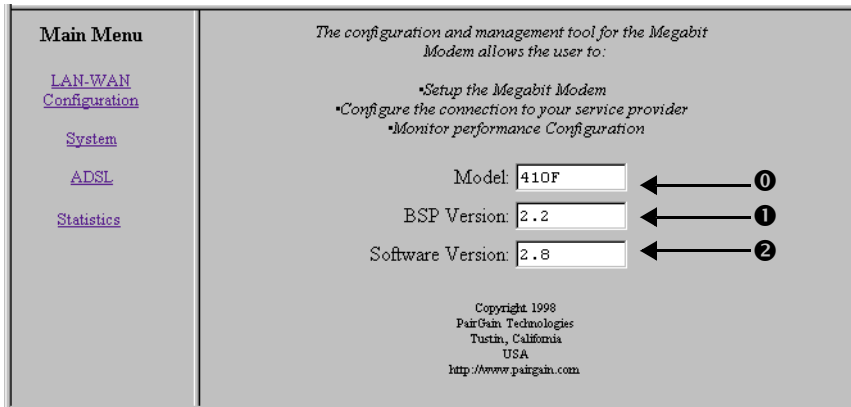
❿   Displays the Megabit Modem **Model** (410F or 420F) that you are managing or configuring.

❶   Displays the **BPS Version** on your modem. The version shown in the figure above is for example only.

❷   Displays the **Software Version** on your modem. The version shown in the figure above is for example only.

SAVING THE CONFIGURATION AND EFFECTING CHANGES

As you make changes to the modem configuration, click the **Submit** button on the Web page to accept changes and write the changes to RAM. After you make all the necessary changes, you must save them to Non-Volatile RAM (NVRAM). The following LAN-WAN configuration changes are not permanent until you write them to NVRAM and will not take affect until the modem is reset:

- for both LAN and WAN:
    - IP address and IP net mask (subnet IP mask) (page 49)
    - RIP version (see page 50)
- when DHCP is enabled (page 50):
    - DHCP start IP address (which the modem automatically sets)
    - primary DNS IP address
    - secondary DNS IP address

See the following sections to:

- save configuration changes to NVRAM on page 37
- reset the modem to activate the configuration on page 38
- reset the modem to restore the factory default values on page 39

When you click the **Submit** button on the Web page to accept ADSL configuration changes, the changes are automatically written to NVRAM. You must reset the ADSL link to effect these changes.

See the following sections to:

- reset the ADSL link to activate the ADSL configuration on page 54
- reset the modem to restore the factory default values on page 39

Saving the Configuration to NVRAM

After clicking **Submit** to write configuration parameters to RAM, update your configuration by writing the parameters to NVRAM. See page 36 for a list of changes you must save to NVRAM and reset the modem to effect.

1 Click **System** on the **Main Menu** to access the **System Menu**.

2 Click **Update Configuration** on the **System Menu**.

3 Do one of the following:

- Click **Proceed** to save to NVRAM.

- Click **Cancel**. The configuration parameters are not written to NVRAM.

4 Reset the modem to effect the configuration using the procedure on page 38.
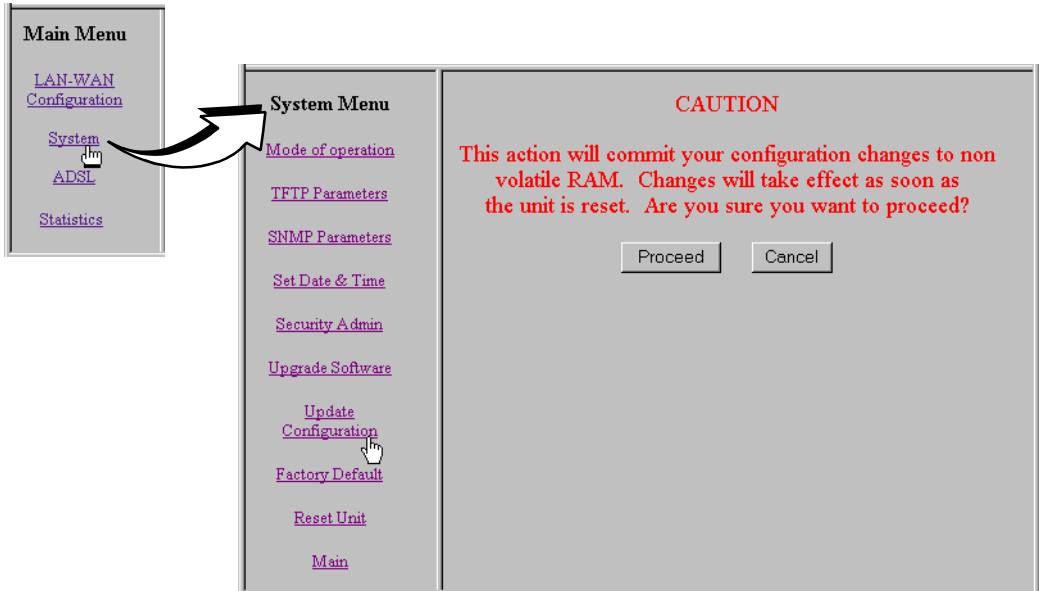
Resetting the Modem

⚠️ **Selecting System Menu, Reset Unit causes all active connections to drop.**

After you make changes to the modem configuration and write the changes to NVRAM (page 37), you must reset the modem. See page 36 for a list of changes you must reset to effect.

1 Click **System** on the **Main Menu** to access the **System Menu.**

2 Click **Reset Unit** on the **System Menu**.

3 Do one of the following:

- Click **Proceed** to reset the modem.

- Click **Cancel**. The modem is not reset.

Main Menu

LAN-WAN Configuration

System

ADSL

Statistics

System Menu

Mode of operation

TFTP Parameters

SNMP Parameters

Set Date & Time

Security Admin

Upgrade Software

Update Configuration

Factory Default

Reset Unit

Main

CAUTION

To Proceed with this option will cause all active connections to drop and the modem to reset. Are you sure you want to proceed?

[Proceed]   [Cancel]
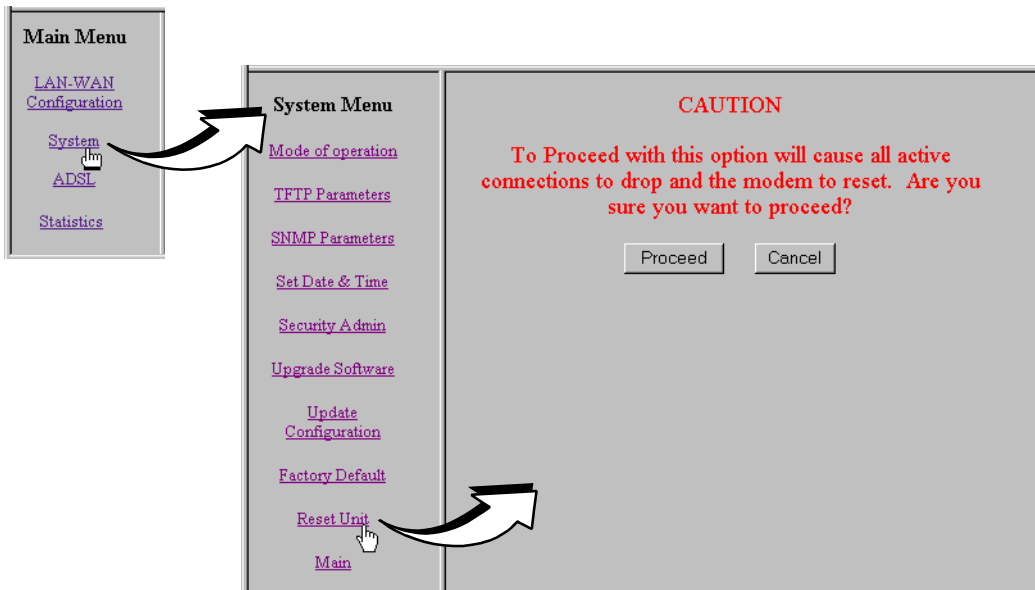
RESETTING THE MODEM TO FACTORY DEFAULTS

You can return Megabit Modem 410F and 420F parameters to the factory default values. This provides a known starting point if you are troubleshooting the system or simply want to reconfigure parameters. The factory default values are listed on .

1   Click **System** on the **Main Menu** to access the **System Menu.**

2   Click **Factory Default** on the **System Menu**.

> **When you click Proceed to return to factory default values, the modem automatically resets.**

3   Do one of the following:

- Click **Proceed** to return to factory default values and reset the modem.

- Click **Cancel**. The parameters to not reset to the factory default values.
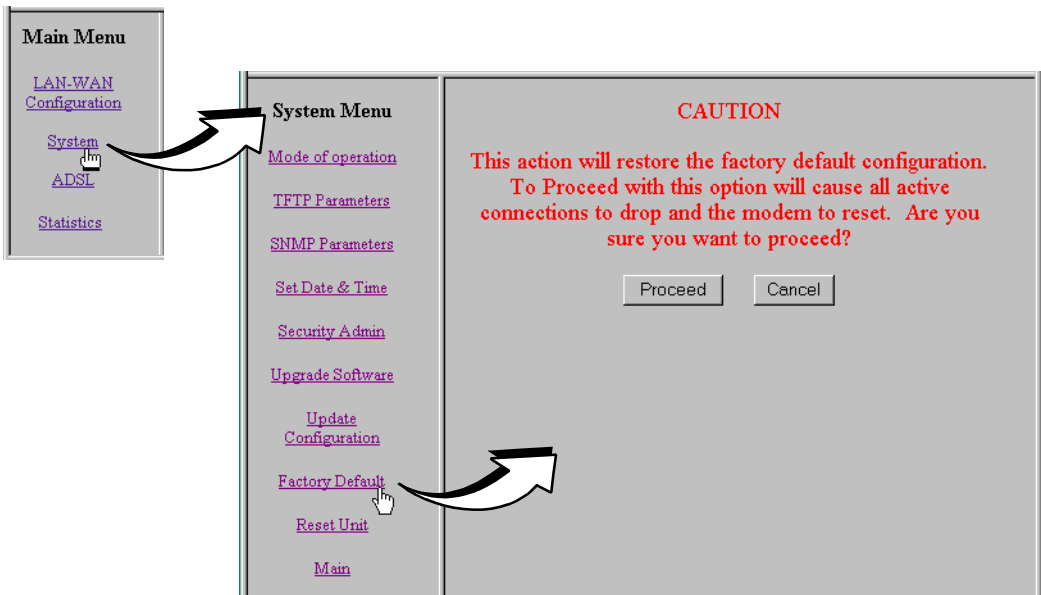
Parameter	Default Value	Parameter	Default Value
System Setup			
System Mode	Bridge/Router RFC1483	Admin IP Address	0.0.0.0
TFTP Server Parameters		SNMP Configuration	
TFTP Server IP Address	192.168.0.2	Enable Trap Sending	disabled
TFTP Server Net Mask	255.255.255.0	Trap Server IP Address	0.0.0.0
Path on the TFTP Server	blank field	Trap Server Net Mask	255.255.255.0
Download File Name	tiger.bin	Trap Community String	public
Set Time and Date		Get Community String	public
Date (mm/dd/yy)	01/01/96	Set Community String	private
Time (hh/mm/ss)	hh/mm/ss		
Brouter LAN-WAN Configuration			
Bridging Configuration		Routing Configuration	
Bridging	enabled	Routing	disabled
Spanning Tree	enabled		
Port Configuration – LAN		Port Configuration – WAN	
IP Address	192.168.0.1	IP Address	0.0.0.0
IP Net Mask	255.255.255.0	IP Net Mask	0.0.0.0
Bridge Port Priority	100	Bridge Port Priority	101
RIP Direction	Both	RIP Direction	Both
RIP Version	Rip Version 1	RIP Version	Rip Version 1
Default Gateway Address	0.0.0.0		
Default Gateway Mask	255.255.255.0		
DHCP Configuration		Static Route Entry	
DHCP	disabled	IP Address	0.0.0.0
Start IP Address	192.168.0.2	Net Mask	0.0.0.0
Primary DNS	0.0.0.0	Gateway	0.0.0.0
Secondary DNS	0.0.0.0		
Gateway	192.168.0.1		
ADSL (DMT) Configuration			
Startup Option	Adaptive at Startup	Margin Threshold	3
Startup SNR Margin	4		
Downstream		Upstream	
Max Data Rate (kbps)	7552	Max Data Rate (kbps)	928
Min Data Rate (kbps)	64	Min Data Rate (kbps)	64
Interleave Option (msec)	04	Interleave Option (msec)	04

CONFIGURING SYSTEM SETTINGS

5

Before configuring the connection between the Megabit Modem 410F and 420F, set up the system parameters for each modem. The following sections show the Web pages you use to configure system parameters. Set the:

- TFTP server IP address and network mask for performing software upgrades on page 42, when required

- SNMP parameters on page 43

- system time and date on page 45

- system admin IP address on page 46

Unless specified otherwise, configuration parameters shown in this section are for example only.

After you set up system parameters, go to Chapter 6, "Configuring the Ports" on page 47 to configure the LAN-WAN and ADSL parameters.

DEFINING TFTP PARAMETERS

A TFTP server is a device on the LAN or WAN from which you can download software updates to your modem. See page 73 for more information on a TFTP server. Also, see page 63 for procedures on how to update the software on your modem.

1 Click **System** from the **Main Menu**.

2 Click **TFTP Parameters** on the **System Menu**.

3 Do the following:

  ❶ Enter the **TFTP server IP address** for the device that will be the TFTP server.

  ❷ Enter the **TFTP server net mask** (IP subnet mask) for the TFTP server.

  ❸ Enter the **Path on the TFTP server** where the download files reside. You can enter a path with a maximum of 20 characters. Alternatively, the field can be left blank and the path can be specified at the TFTP server.

  ❹ Enter the **Download File Name**. This is the name of the file that contains the download software updates. The default is tiger.bin.

4 Click **Submit** to accept the changes.
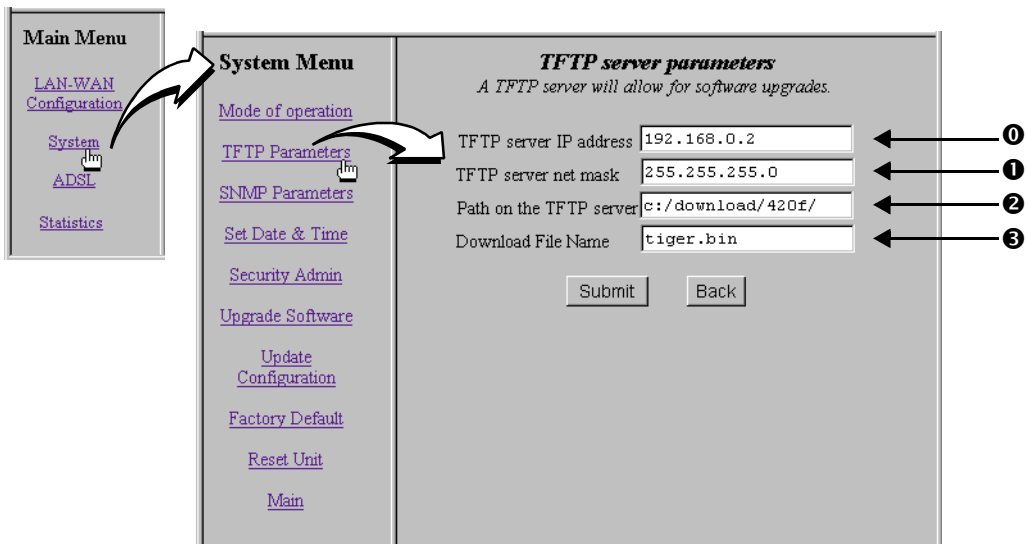
DEFINING SNMP PARAMETERS

The modem has an SNMP agent that allows it to be managed remotely by a Network Management System (NMS). See for more information about managing the modem through SNMP.

1   Click **System** from the **Main Menu**.

2   Click **SNMP Parameters** on the **System Menu**.

3   Do the following:

    ❶   Select **Enable Trap Sending** if you want the modem to send traps to a server.

    ❷   Enter the **Trap Server IP Address** for the server to which the traps will be sent.

    ❸   Enter the **Trap Server Net Mask** (subnet mask) for the server to which the traps will be sent.
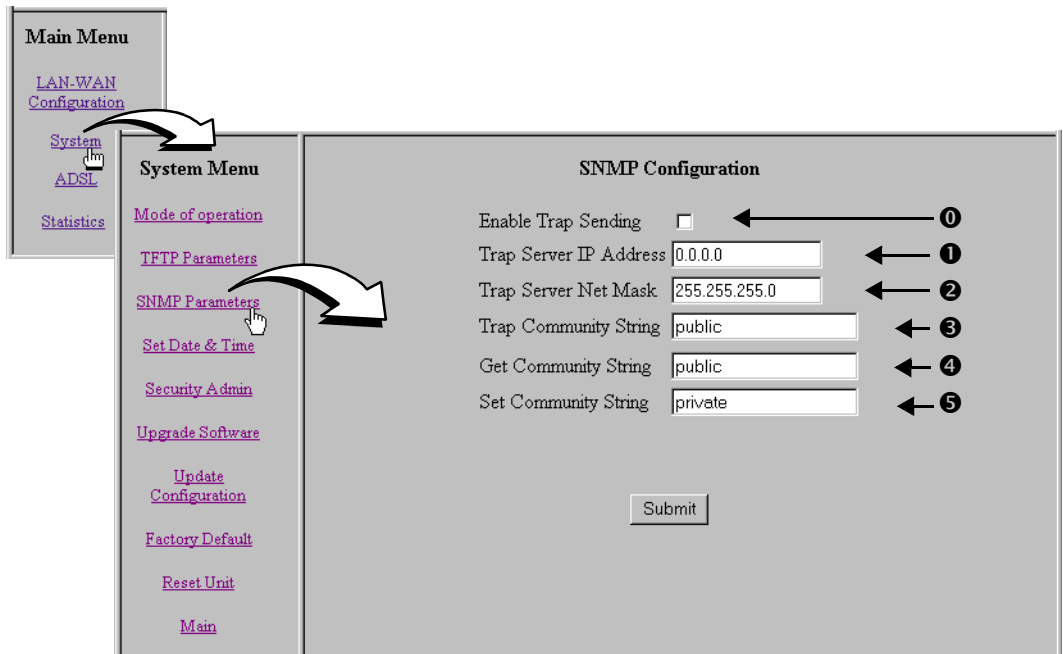
> **You can change the community string to a name you choose. The fields have default names as shown in the screen on page 43 and are case sensitive. If you change the name, however, the community string name must match on both the manager and agent to allow access to the SNMP function.**

❸ Public is the default **Trap Community String** which is an authentication string for the trap receiver. You can change the name, using up to 19 characters.

❹ Public is the default **Get Community String** which is an authentication string that enables an NMS to get status from the modem agent. You can change the name, using up to 19 characters.

❺ Private is the default **Set Community String** which is an authentication string for an NMS to set or change parameters on the modem agent. You can change the name, using up to 19 characters.

4 Click **Submit** to accept the changes.

SETTING THE TIME AND DATE

Set the time and date for the modem.

1   Click **System** from the **Main Menu**.

2   Click **Set Date & Time** on the **System Menu**.

3   Do the following:

❍   Enter the **date** in the format **mm/dd/yy** (for example, 03/10/00 is March 10, 2000).

❶   Enter the **time** in the format **hh:mm:ss** (for example, 07:21:55 is 21 minutes and 55 seconds past 7 a.m.).

**4**   Click **Submit** to accept the changes.
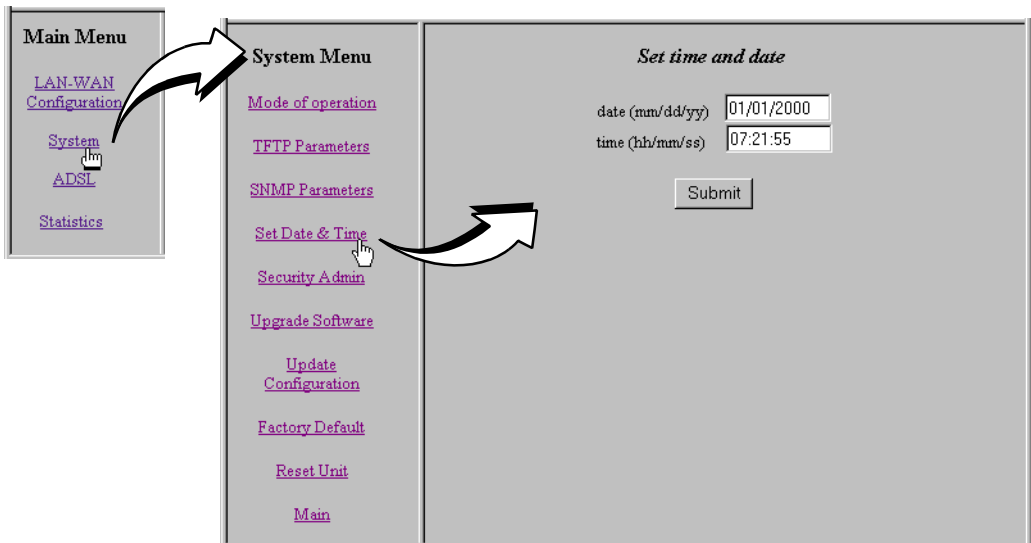
CONFIGURING THE ADMIN IP ADDRESS

The IP address you enter in the **Admin IP Address** field determines which devices on the network can manage the Megabit Modem 410F or 420F. You can select:

- limited access where only one device on the network can manage the modem

- general access where any device on the network can manage the modem

Do the following to configure administration for your modem:

1 Click **System** from the **Main Menu**.

2 Click **Security Admin** on the **System Menu**.

3 Select one of the following and enter the appropriate IP address:

- When you allow only one device on the network to manage the modem, enter the IP address for that one device in the IP address field.

- When you allow any device on the network to manage the modem, enter **0.0.0.0** in the IP address field.

4 Click **Submit** to accept the address you entered.
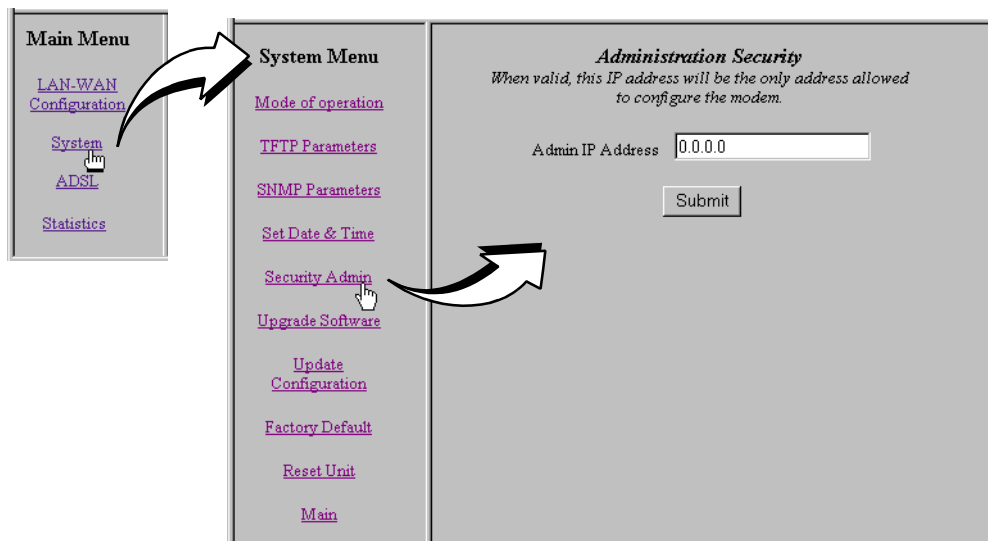
CONFIGURING THE PORTS 6

Configure the connection between the Megabit Modem 410F and 420F using the **Brouter LAN-WAN Configuration** page. You can configure both the Megabit Modem 410F and 420F as a bridge to forward Ethernet data based on MAC addresses, as a router to route Ethernet-encapsulated IP datagrams based on IP addresses, or as both. If you select both, the modem routes all IP datagrams and bridges everything else. Be sure to configure the same settings for both modems. For more information about these options, see "Bridging and Routing" on page 69.

Configure the ADSL connection between the Megabit Modem 410F and 420F using the **CO End ADSL (DMT) Configuration** page from the 410F (ATU-C). For more information about the ADSL connection, see "ADSL" on page 67 and "Rate Adaptive Transmission" on page 68.

Do the following to configure the Megabit Modem 410F and 420F:

- Configure parameters for communicating between the Megabit Modem 410F and 420F over the WAN, and set up the LAN side of the configuration, including DHCP. If DHCP is enabled, the modem will serve IP addresses to devices on the LAN (page 48) when routing is enabled.

- Configure ADSL service between the Megabit Modem 410F and 420F (page 52).

- Save the configuration and effect your changes (page 36).

> **Although you have submitted your configuration changes:**
> - **some LAN-WAN parameter changes are not permanent until you write them to NVRAM and do not take effect until you reset the modem**
> - **ADSL parameter changes do not take effect until you reset the ADSL link**
>
> **See "Saving the Configuration and Effecting Changes" on page 36 for additional information.**

CONFIGURING THE LAN AND WAN

Configure the LAN and WAN parameters.

1 Click **LAN-WAN Configuration** on the **Main Menu** to access the **Brouter LAN-WAN Configuration** page.

2 Enter the bridging configuration parameters:

0 Select **Bridging Enable** to forward Ethernet data based on MAC addresses.
Click **Spanning Tree Enable** to enable the Spanning Tree protocol.

> **The Spanning Tree protocol eliminates loops in a bridged LAN topology. When Spanning Tree is selected, it becomes active when bridging is enabled. If the modem is configured for routing only, Spanning Tree does not run. See "Spanning Tree Protocol" on page 69 for more information.**

3 Enter the routing configuration parameters:

1 Select **Routing Enable** to forward IP datagrams based on IP addresses. See "Routing" on page 71 for more information.
Click **Static Route Table** to get a dialog to set up static routes. The modem can accept up to 32 static route entries. Go to "Defining Static Route Entries" on page 51 to configure these parameters.

4 Enter the LAN and WAN port configuration parameters:

2 Enter the **LAN IP Address** for the modem Ethernet 10/100BASE-T LAN port. The default IP address for the LAN port is 192.168.0.1.
Enter the **WAN IP Address** for the ADSL (WAN) port. This option is available only if routing is enabled and you must enter a valid IP address. When routing is not enabled, the field is blank.

3 Enter the **LAN IP Net Mask** (subnet IP mask) for the modem Ethernet 10/100BASE-T LAN port. The default IP subnet mask is 255.255.255.0.
Enter the **WAN IP Net Mask** (subnet IP mask) for the ADSL (WAN) port. This option is available only if routing is enabled and you must enter a valid subnet mask. When routing is not enabled, the field is blank.

4 The **LAN Bridge Port Priority** is preset to **100**. Bridge Port Priority is used when **Bridging** mode and **Spanning Tree** are both enabled and determines which modem port has higher priority when active simultaneously.
The **WAN Bridge Port Priority** is preset to **101**. Bridge Port Priority is used when **Bridging** mode and **Spanning Tree** are both enabled and determines which modem port has higher priority when active simultaneously.

❺ For the **LAN** and **WAN RIP Direction**, select the direction you want RIP (Routing Information Protocol) activated in **Routing** mode. See "Routing" on page 71 for more information on RIP.

❻ For the **LAN** and **WAN RIP Version**, select the version of RIP used for intergateway transmissions in **Routing** mode. See "Routing" on page 71 for more information on RIP.

❼ Enter the **LAN Default Gateway Address** (IP address) for the modem to access other LAN segments or IP addresses not in its routing table.

❽ Enter the **LAN Default Gateway Mask** (subnet IP mask) for the modem to access other LAN segments or IP addresses not in its routing table.

5 Enter the DHCP configuration parameters:

> **DHCP can be enabled only when routing is enabled. If you select DHCP Enable when routing is not enabled, the modem deselects DHCP Enable when you click Submit. If you disable routing, the modem deselects DHCP Enable when you click Submit.**

❾ Select **DHCP Enable** to enable the modem to act as a DHCP server to automatically assign IP addresses to devices on the LAN. If you select DHCP, ensure that all devices on the LAN have the TCP/IP stack set to **obtain an IP address automatically** (see "Setting Up the PC to Access the Modem Web Pages" on page 27).

The modem automatically enters the **Start IP Address** for the first device on the LAN as one address higher than the Ethernet port on the modem with DHCP enabled. You cannot edit this field.

Enter an IP address for a device that will provide **Primary DNS**. DNS translates human-readable machine names into IP addresses.

Enter an IP address for a device that will provide **Secondary DNS**. DNS translates human-readable machine names into IP addresses (optional).

The modem enters a default **Gateway** IP address, which is the same IP address as the Ethernet 10/100BASE-T port of the modem. You can edit this field.

6 Click **Submit** to accept the Brouter LAN-WAN configuration.

7 Some parameter changes are not permanent until you write them to NVRAM and do not take effect until you reset the modem. See "Saving the Configuration and Effecting Changes" on page 36.

Defining Static Route Entries

You can enter up to 32 static routing IP addresses that the modem recognizes in the routing address tables, in addition to the routing IP addresses that the modem learns. (See "Routing" on page 71 for more information on defining static route entries.)

1 Enter static routes.

❶ Enter the **Destination** IP address and **net mask** destination.

❷ Enter the **Gateway** IP address to the next hop.

❷ All static route entries are listed in this table after you enter the parameters in fields **❶** and **❶**.

2 Click **Add** to accept this entry.

3 To delete a **Static Route Entry**:

a Click the entry in the list shown in field **❷** above to select it. The entry displays in the **Static Route Entry** fields **❶** and **❶**.

b Click **Delete** to remove the entry.

4 Click Done when you complete all configuration additions and deletions.

CONFIGURING ADSL SERVICE

You configure the ADSL transceiver service for both the Megabit Modem 410F and 420F from the Megabit Modem 410F (ATU-C) only using the CO End ADSL (DMT) Configuration page. From the Megabit Modem 420F (ATU-R), you view the ADSL configuration parameters from the read-only Remote End ADSL (DMT) Configuration page.

You must reset the ADSL link to effect ADSL configuration changes (see "Resetting the ADSL Link" on page 54).

Enter or view the ADSL configuration parameters. Configure items ❸ through ❻ for both downstream and upstream. Downstream transmission is from the 410F to the 420F; upstream is from the 420F to the 410F.

1 Click **ADSL** on the **Main Menu**, then click **ADSL Configuration** on the **ADSL Menu** to access the **ADSL (DMT) Configuration** page.

2 Configure the ADSL startup parameters.

❶ The **Startup Option** determines how an ADSL transmission rate is established when the modem is reset. The following table describes the available options.

Startup Option	Description
Adaptive at Startup (default)	The modems attempt to come up at the downstream and upstream **Max Data Rate (kbps)** with a margin greater than or equal to the **Startup SNR Margin**. If the data rates cannot be obtained, the modems attempt lower data rates that are greater than or equal to the downstream and upstream **Min Data Rate (kbps)** until sync occurs. If the modems do not achieve the rates, they will not sync.
Fixed	The modems attempt to come up only at the downstream and upstream **Max Data Rate (kbps)** values with a margin greater than or equal to the **Startup SNR Margin**. If the data rates cannot be obtained, the modems continue to attempt the data rates. If the modems do not achieve the rates, they will not sync.

❶ Enter the **Startup SNR Margin**. The value can be any number between **0** and **15** dB. The default is **4**.

Startup SNR (Signal to Noise Ratio) margin is the margin the modem must achieve to come up.

3 Configure the SNR margin threshold.

❷ Enter the **Margin Threshold**. The value can be any number between **0** and **15** dB. The default is **3**.

The margin threshold determines the SNR margin value below which the ADSL MAR LED on the modem front panel turns off.

4   Configure the ADSL downstream and upstream parameters.

❸   Enter the **Max Data Rate (kbps).** The values entered should be in 32 kbps increments. If a non-32 kbps value is entered, the value is automatically rounded up to the nearest 32 kbps value. This is the maximum data rate attainable by the modems, and the data rate at which the modems sync will be equal to or less than this value as per the **Startup Option** parameter.

The downstream **Max Data Rate (kbps)** range is **64** kbps to **7552** kbps, in 32 kbps increments. The default is **7552**.

The upstream **Max Data Rate (kbps)** range is **64** kbps to **928** kbps, in 32 kbps increments. The default is **928**.

❹   Enter the **Min Data Rate (kbps)**. This is the minimum data rate available for the modems, and the data rate at which the modems sync will be equal to or greater than this value as per the **Startup Option** parameter.

The downstream **Min Data Rate (kbps)** range is **64** kbps to **7552** kbps, in 32 kbps increments. The default is **64**.

The upstream **Min Data Rate (kbps)** range is **64** kbps to **928** kbps, in 32 kbps increments. The default is **64**.

❺   Select the **Interleave Option (msec)**. For downstream and upstream, the options are **02**, **04**, **08**, and **16** msec. The default is **04**.

Higher interleave values provide more noise immunity, but increase the delay through the system.

5   Click **Submit** when you complete all the ADSL configuration settings.

6   After you make changes to the ADSL configuration, effect the configuration completing the procedures for "Resetting the ADSL Link" on this page.

Resetting the ADSL Link

Selecting ADSL Menu, Reset Link brings down the ADSL link between the Megabit Modem 410F and 420F.

To effect ADSL configuration changes, you must reset the ADSL link between the Megabit Modem 410F and 420F.

> 📝 **Selecting System Menu, Reset Unit resets the modem and ADSL link (see page 38).**

1 Click **ADSL** on the **Main Menu** to access the **ADSL Menu**.

2 Click **Reset Link** on the **ADSL Menu**.

3 Do one of the following:

- Click **Proceed** to reset the ADSL link.

- Click a different **ADSL Menu** option to cancel. The ADSL link is not reset.
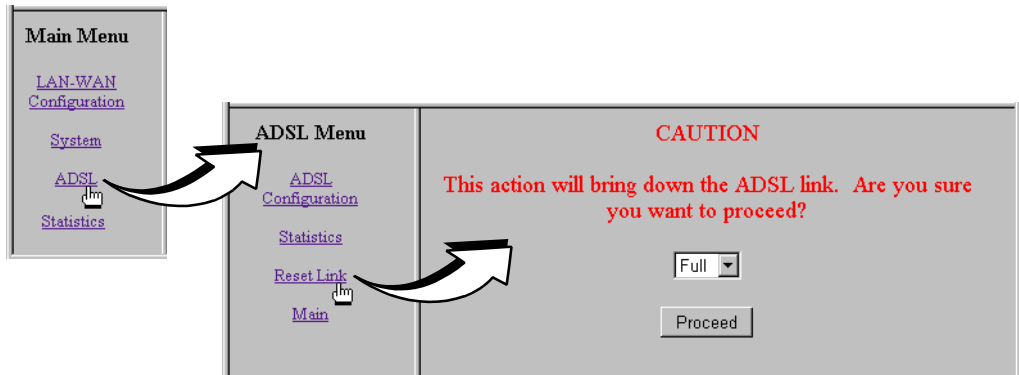
VIEWING STATISTICS

You can view status for the ADSL link ("Viewing ADSL Status" on this page) and for WAN and LAN statistics ("Viewing Network Statistics" on page 59).

VIEWING ADSL STATUS

The Megabit Modem 410F and 420F display the status of the ADSL link. From the **Main Menu**, select **ADSL** to display the **ADSL Menu** and **ADSL Statistics** page (see page 57).

View the following ADSL statistics: Items ❷ through ❽ have downstream and upstream values.

❿ System time and date and total hours since power on occurred.

❶ ADSL link is synchronized between the Megabit Modem 410F and 420F, or the link has no connection.

❷ Any alarm conditions, such as Loss Of Sync (LOS), Loss Of Frame (LOF), Loss Of Margin (LOM), or Loss of Cell Delineation (LCD), since power on occurred or the statistics were last cleared.

❸ The SNR margin at which the modem is currently operating.

❹ Minimum SNR value recorded since power on occurred or the statistics were last cleared.

❺ Total number of seconds that the ADSL link had errors in a 24-hour span, or since power on occurred or the statistics were last cleared (if less than 24 hours).

❻ Total amount of time that the lines were not available for transmission since power on occurred or the modem statistics were last cleared (total unavailable seconds).

❼ Line attenuation in decibels.

❽ Data rates at which the modem is connected.

❾ Select **Clear** to reset all statistics.

VIEWING NETWORK STATISTICS

The Megabit Modem 410F and 420F display status for the LAN and WAN links. From the **Main Menu**, select **Statistics** to display the **Statistics Menu**.

LAN Statistics

The Megabit Modem 410F and 420F display status for the LAN. Click **LAN Statistics** from the **Statistics Menu**.

View the following LAN information:

❶ System time and date and total hours since power on occurred.

❷ IP and Ethernet addresses for the modem LAN port.

❷ Total number of IP packets processed and the number of packets with incorrect checksums since power on occurred or the statistics were last cleared.

❸ Number of errored packets detected at this port and the number of packets forwarded since power on occurred or the statistics were last cleared.

❹ Number of packets reassembled at this port and the number of transmissions where a route was not found in router table since power on occurred or the statistics were last cleared.

❺ Total number packets received and transmitted since power on occurred or the statistics were last cleared.

❻ Collisions is not supported.

❼ Selecting **Clear** resets all statistics.

WAN Statistics

The Megabit Modem 410F and 420F display status for the WAN. Click **WAN Statistics** from the **Statistics Menu**.
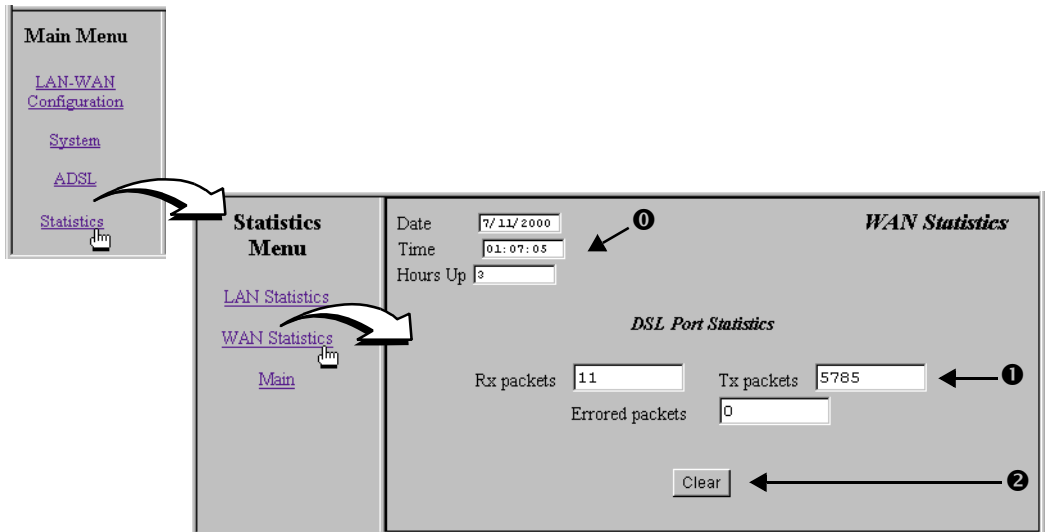
View the following WAN information:

❶   System time and date and total hours since power on occurred.

❷   Port statistics, including the number of packets received and transmitted on the connection and the number of errored packets since power on occurred or statistics were last cleared.

❸   Select **Clear** to reset statistics.

MAINTENANCE AND TROUBLESHOOTING   **8**

This section provides the following maintenance and troubleshooting procedures:

- To update modem software, see this page.

- For troubleshooting procedures, see .

UPDATING SOFTWARE

When you need to download software upgrades to your system, use the Megabit Modem 410F and 420F Web pages (page 34). You download the new software from a device on your LAN or WAN that is your TFTP server. When you configured system parameters (Chapter 5, "Defining TFTP Parameters" on page 42), you set up the IP address for the TFTP server and a directory path to the software. Ensure that the binary file is available to download from the TFTP server.

1   Click **System** on the **Main Menu** to access the **System Menu**.

2   Click **Upgrade Software** on the **System Menu**.

3   Do one of the following:

- Click **Cancel**. The software upgrade does not occur.

- Click **TFTP** to display the TFTP server parameters (see "Defining TFTP Parameters" on page 42). Ensure that they are properly specified. Click **Back** to return to **Upgrade Software**.

> **Before initiating a software upgrade, ensure that the path and file name for the modem software are properly specified.**
>
> - **If you specified a directory on the TFTP server when you configured system parameters, ensure that the file is in that directory.**
>
> - **If you left the field blank and specified the path at the TFTP server, ensure that the path points to the directory that contains the file.**

4 If you clicked **TFTP** in Step 3, do one of the following:

- Click **Proceed.** The modem software upgrade begins.

- Click **Cancel**. The software upgrade does not occur.

- Click **TFTP Parameters** to modify the TFTP configuration.

Main Menu

LAN-WAN
Configuration

System

ADSL

Statistics

System Menu

Mode of operation

TFTP Parameters

SNMP Parameters

Set Date & Time

Security Admin

Upgrade Software

Update
Configuration

Factory Default

Reset Unit

Main

CAUTION

Confirm download file name in TFTP menu is correct.

Proceeding will upgrade the unit software via TFTP.
Proceeding with this option will cause all active
connections to drop and the modem to reset.
Are you sure you want to proceed?

[Proceed] [Cancel] [TFTP]

Troubleshooting

If this occurs:	Try this:
PC or hub not communicating with the modem	• Check the LAN LINK LED. If it is off, check the cabling to the 10/100BASE port and to the hub or the NIC card in the PC to ensure it is secure. • Check the position of the MDI/MDI-X switch. Set the switch to MDI when connecting to a PC. Set the switch to MDI-X when connecting to a hub or router. • Check that you are using a Web browser (Netscape or Internet Explorer) version 4.0 or newer. • Check that you have a TCP/IP protocol stack installed on your PC. • If this is the initial installation, check that you set the IP address on your PC to obtain an IP address automatically. Make sure you have configured the LAN IP address of the modem to an address that is on the correct subnet. See "Setting Up a Static IP Address for the PC" on page 27. • Check the NIC card installation for correct IRQ, drivers, and adapter setup. See the appropriate documentation for the NIC card.
ADSL SYNC LED	When the LED remains off, it indicates that the modem is not detecting the other modem. Verify that the modem is connected at the far end. Flashing green indicates that the modem is attempting to bring up the link. Solid green indicates that the loop is up. The modem synchronizes at a minimum transmission rate of 64 kbps. The modem rate adapts in increments of 32 kbps.
ADSL MARGIN LED off	When the LED is off, it indicates that the margin is below the margin threshold configured on the 410F (see the **Margin Threshold** parameter on page 53).
LAN TX and RX LEDs are not on	Check that the LAN LINK LED is on. If it is on, you are simply not transmitting or receiving data on the LAN 10/100BASE-T port. If, however, the LAN LINK LED is not on, check the section "PC or hub not communicating with the modem" in this table.
ADSL TX and RX LEDs are not on	Check that the ADSL SYNC LED is on. If it is on, you are simply not transmitting or receiving data on the ADSL (WAN) port. If, however, the ADSL SYNC LED is not on, your modem has lost the link with the other modem.

If none of the above corrects your problem, contact ADC Technical Assistance (see page 81).

TECHNICAL REFERENCE

9

This chapter provides technical information about features of the Megabit Modem 410F and 420F.

ADSL

The DMT ADSL technology provides the high-speed transmission between the Megabit Modem 410F and 420F. This transmission occurs over a single-pair telephone line.

Asymmetric Digital Subscriber Line (ADSL) is the technology used to transmit data between the Megabit Modem 410F and 420F at the physical layer. It provides data at asymmetric rates so that downstream traffic from the 410F to the 420F is faster than upstream traffic from the 420F to the 410F. The downstream transmission rate is up to 7.552 Mbps, while the upstream rate is up to 928 kbps.

Discrete Multitone (DMT) is the line coding used for ADSL. Basically, it divides the bandwidth into subchannels. Some subchannels are allocated to upstream and downstream traffic.

DMT ADSL provides rate-adaptive transmission that allows the best transmission rate determined by distance and line conditions.

RATE ADAPTIVE TRANSMISSION

The following definitions are useful for understanding the operation of the Megabit Modem:

- Bit Error Rate (BER) is the ratio of received bits that are in error relative to the total number of bits received, measured over time. For example, 10^{-7} BER means that on average one error occurs per 10^7 bits received.

- Signal to Noise Ratio (SNR) is the ratio (typically expressed in dB) of the received signal power to the received noise power. It is a measure of the quality of the transmission.

- Margin (SNR margin) is the amount of degradation in SNR that the system can tolerate under the current conditions and still achieve 10^{-7} BER. A margin of 6 dB, for example, means that the SNR can degrade by 6 dB and still provide a performance of 10^{-7} BER. The Megabit Modem 410F and 420F have a margin configuration option that defaults to 3 dB, but can be set anywhere between 0 to 15 dB.

- Reach is the longest loop length that the system can support with a given margin.

Rate Adaptation

With ADC's rate adaptive technology, the Megabit Modem 410F and 420F can automatically startup or adjust to the fastest speed possible, given the transmission distance and line conditions. Or, you can set the modem to a specific rate. For details, see the **Startup Option** parameter on . For information about setting the maximum and minimum data rates for upstream and downstream transmission, see the **Max Data Rate (kbps)** and **Min Data Rate (kbps)** parameters on .

Reach, Data Rate, SNR Margin, and Noise Environment

The maximum transmission rate of the Megabit Modem 410F and 420F is determined by distance, SNR margin, and the condition of the line (wire gauge, condition noise environment). The figure on shows the relationship between reach and data rate for a given set of conditions. The plots can be used to determine the achievable reach at a given data rate, or they may be used to determine the achievable data rates at a given distance. In all cases except the no noise case, a margin of 4 dB was allocated above the SNR that provides a 10^{-7} BER.

BRIDGING AND ROUTING

Bridging

You can configure the Megabit Modem 410F and 420F as a bridge to forward Ethernet data based on MAC addresses.

MAC Layer Bridging

A bridge moves information across an internetwork from a source to a destination at the link layer (of an OSI reference model). The information is sent to a physical address known as a Media Access Control (MAC) address. The Megabit Modem 410F and 420F provide transparent Ethernet MAC-layer bridging. The bridge learns up to 1024 addresses.
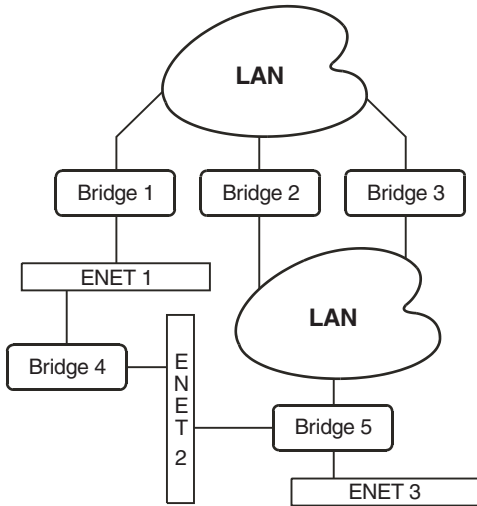
Spanning Tree Protocol

The Megabit Modem 410F and 420F support the 802.1d Spanning Tree protocol, which eliminates loops in a LAN topology by partitioning out redundant links between LAN segments. This ensures that there is only one path, or link, between any two nodes on the network. If this link goes down, Spanning Tree re-enables partitioned links to create a new loop-free topology if possible.

An example of the active topology is shown on . In this example, the spanning tree algorithm partitions out the bridge from LAN A to LAN B and the link from ENET2 to Bridge 5.

Example LAN Physical Network

This physical configuration is valid only when used with Spanning Tree to eliminate loops.

LAN

| Bridge 1 | Bridge 2 | Bridge 3 |

ENET 1

LAN

Bridge 4

ENET 2

Bridge 5

ENET 3

Loop-free Topology
Using Spanning Tree Protocol

LAN A

| Bridge 1 | Bridge 2 | Bridge 3 |

ENET 1

LAN B

Bridge 4

ENET 2

Bridge 5

ENET 3
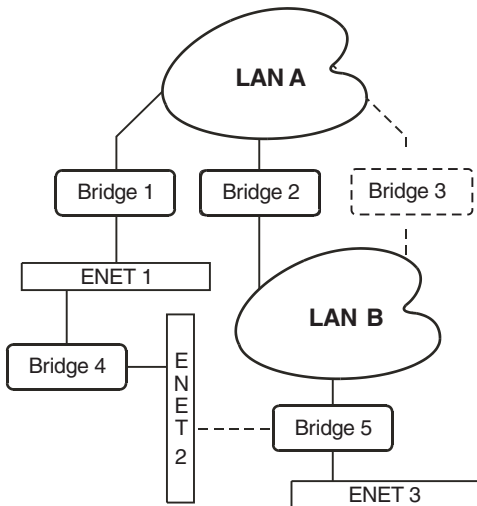
Routing

You can configure the Megabit Modem 410F and 420F router to route Ethernet-encapsulated IP datagrams based on IP addresses. Use Routing Information Protocol (RIP) to automatically identify the route from the connection on the transmitting modem to the receiving modem. You can specify the direction and version of RIP that allows other routers to update their routing tables automatically (for example, information on how many hops between destinations) with the **RIP Version** and **RIP Direction** parameters (see page 50). The version of RIP you select for the connection must match the version on the receiving modem. Versions RIP 1 and RIP 1 compatible use broadcast. Version RIP 2 uses multicast.

The router also learns addresses. In addition to the addresses it learns, you can add 32 static route entries using the **Static Route Entry** page (see page 51). Through the static IP routing feature, you can configure the modem as an IP router with statically programmed route entries. You can enable this function to provide broadcast filtering and to prevent eavesdropping by specifying multiple destination gateways. When static IP routing is enabled, you can access only specific remote IP subnets or hosts.

Since IP routers make forward or filter decisions based on the network-layer IP address instead of the MAC hardware address, MAC-level broadcast frames are prevented from reaching unwanted destinations in the network.

DHCP

The Megabit Modem 410F and 420F support Dynamic Host Configuration Protocol (DHCP). If you enable DHCP, the modem acts as a DHCP server and automatically assigns IP addresses to devices on the LAN. Ensure that the TCP/IP properties are set on the PC operating system (such as Microsoft Windows 95) to automatically obtain the IP address from the modem.

MANAGEMENT PROTOCOLS

Simple Network Management Protocol (SNMP) is used to configure system and bridge parameters, to monitor statistics, and to perform advanced management tasks.

SNMP

This management protocol specifies how to send information between a Network Management System (NMS) and managed devices on a network. Managed devices run a program called an agent. The agent interprets SNMP requests and responds to them. The NMS communicates with the agents in the managed devices to:

- set configuration

- get configuration

- get status

A Management Information Base (MIB) defines the configuration and status parameters. The Internet Engineering Task Force (IETF) specifies standard MIBs for certain types of devices, ensuring any NMS can manage them. Additionally, vendors can issue proprietary MIBs for their devices to fit specific needs.

MIB and Trap Support

Each managed device has configuration, status, and statistical information that defines its functionality and operational capabilities. These elements make up the MIB for the device being managed. The MIB defines the kind of information an NMS can retrieve from a managed device, and the settings an NMS can control in a managed device. See "MIBs and Traps" on page 77 for a listing of the MIBs and traps that the Megabit Modem 410F and 420F support.

DNS RESOLUTION

If you want Domain Name System (DNS) resolution, you need to specify the IP address for a device to be the DNS resolver. You can also specify another IP address to designate a second device for a secondary DNS resolver. The DNS device maps human-readable addresses to IP addresses. A human-readable address is one such as `maggie.copro.company.com` that contains a host name and domain. The DNS resolver maps that name to the IP address that is a numeric (four octet) value such as 192.168.30.25 (see page 50 for the example on how to configure a DNS address).

TFTP SERVER

Trivial File Transfer Protocol (TFTP) is the TCP/IP standard for file transfer. It provides the service with minimal capability and minimal overhead. TFTP uses UDP for connectionless delivery.

Specifications and Data   A

WAN Interface Specifications

The following are the specifications for the ADSL (Asymmetric Digital Subscriber Line):

Maximum transmission rate:	
Downstream	7.552 Mbps
Upstream	928 kbps
Minimum transmission rate to sync	64 kbps
Data rate configuration	Full rate, rate adaptive (default configuration)
Rate-adaptive data rate resolution	32-kbps increments
Signal format	DMT (Discrete Multitone) line code
Connector	RJ-11

LAN Interface Specifications

Protocol	Ethernet with 10/100BASE-T autosensing (IEEE 802.3 for 10BASE-T)
Connector	RJ-45

PHYSICAL SPECIFICATIONS

Height	1.2 inches (3.1 cm)
Width	6.9 inches (17.5 cm)
Depth	9.2 inches (23.4 cm)
Weight	2.2 lbs (1.0 kg)

POWER SUPPLY

Voltage	100 to 240 Vac
Frequency	50 to 60 Hz
Current	0.3 Amps

ENVIRONMENTAL

Temperature	32 to 122 °F (0 to 50 °C)
Relative Humidity	up to 95% non-condensing
Altitude	between -200 and 13,000 feet (-61 to 3.962 meters)

COMPLIANCE

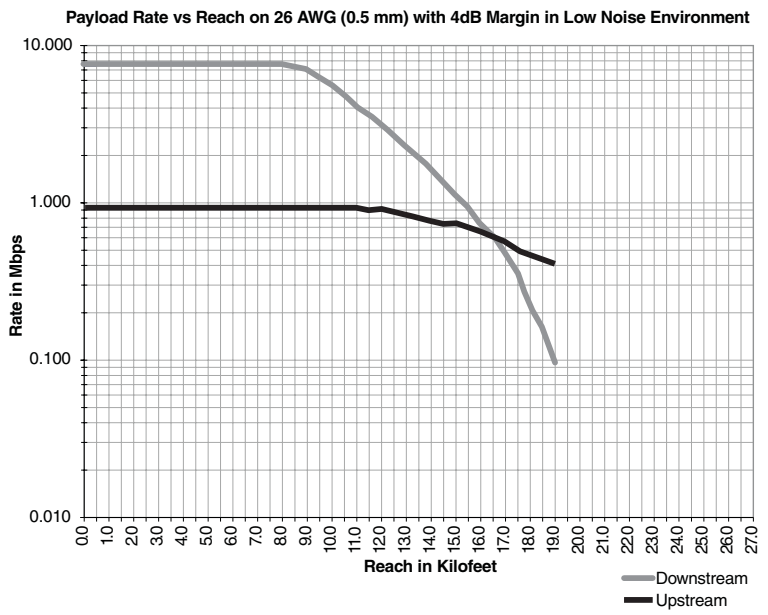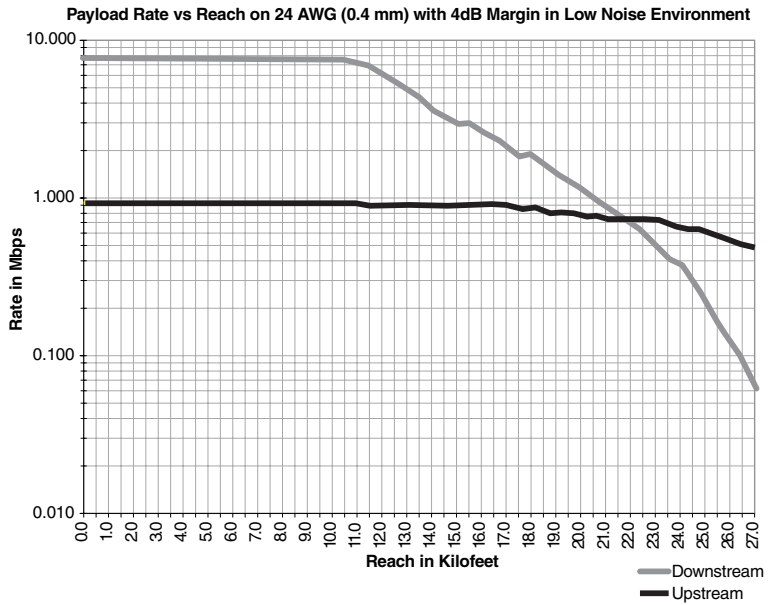|	
Emissions and Immunity Compliances	• FCC Part 15, Subpart B, Class B • CE (EN 55022 and EN 50082-1)
Operations and Safety Compliances	• cUL • UL-1950 • CE (EN 300 386-01) • ICE 950

PROTOCOLS

- ANSI/IEEE Std 802.1D Information Technology – Telecommunications and information exchange between systems – Local area networks – Media access control (MAC) bridges
- RFC 768 User Datagram Protocol
- RFC 791 Internet Protocol
- RFC 792 Internet Control Message Protocol
- RFC 826 Ethernet Address Resolution Protocol
- RFC 1058 Routing Information Protocol (RIP-I)
- RFC 1157 Simple Network Managing Protocol (SNMP)
- RFC 1350 The TFTP Protocol (revision 2)
- RFC 1483 Multiprotocol Encapsulation over ATM Adaption Layer 5
- RFC 1723 Routing Information Protocol Version 2 (RIP-II) – Carrying Additional Information
- RFC 2131 Dynamic Host Configuration Protocol (DHCP)
- RFC 2132 DHCP Options and BOOTP Vendor Extensions

MIBS AND TRAPS

- RFC 1213 Management Information Base for Network Management of TCP/IP-based Internets: MIB-II
- RFC 1215 Convention for defining traps for use with the SNMP
- RFC 1493 Definitions of Managed Objects for Bridges
- RFC 1695 Definitions of Managed Objects for ATM Management Version 8.0 using SMIv2
- RFC 1724 RIP Version 2 MIB Extensions
- RFC 2662 Definitions of managed objects for ADSL lines (Also DSL Forum TR-006)
- PairGain Agent MIB
- PairGain Tiger MIB

RATE VS. REACH

Payload Rate vs Reach on 24 AWG (0.4 mm) with 4dB Margin in Low Noise Environment

Payload Rate vs Reach on 26 AWG (0.5 mm) with 4dB Margin in Low Noise Environment

HARDWARE

The following provides additional information about Megabit Modem 410F and 420F such as the installation kit and modem connectors pinouts.

Installation Kit

The following items are included in the installation kit and are used to install each Megabit Modem 410F and 420F as shown in .

Part	Description	Function
Rubber feet	Four black rubber feet	Attach to the base of the modem.
Grey cable	Silver-satin phone cord with 4-pin modular plugs (straight-through)	Connects the modem ADSL connector to the wall phone jack for access to the Internet.
Black cable	CAT 5, cable with 8-pin modular plugs (straight-through)	Connects the modem 10/100BASE-T connector to the LAN through a hub or to a PC NIC.
Power cable	Power supply with optional power cord (this item is ordered dependent on the type of power supply and cord required for your location)	Connects the modem POWER connector to the local power source.
Screws	Two $6x^1/_2$-inch sheet metal screws	Installs into a wall for wall-mounting modems.
Grey cable and adapter	Flat cable with RJ-45 connectors and a DB-9 to RJ-45 adapter.	Connects the RS-232 management port to an ASCII terminal or a PC running terminal emulation software. Adapter assembly connects to a DB-9 connector on the PC. Then, one RJ-45 connector installs in the adapter and the other connector into the console port on the modem.

Connector Pinouts

You may choose to make your own cables for the ADSL RJ-11 connector and the 10/100BASE-T Ethernet connector on the rear of the modem. The following sections provide the pinout information you need.

ADSL Port

The following table shows the signal on each pin for the ADSL port. The connector for this interface is an RJ-11. See page 14 for the location of this port.

Pin	Signal
1	Not used
2	Not used
3	Ring
4	Tip
5	Not used
6	Not used

10/100BASE-T Port

The following table shows the signal on each pin when the switch is in either the MDI or the MDI-X position for the 10/100BASE-T port. The connector for this interface is an RJ-45. See page 14 for the location of this port.

MDI	MDI-X	Signal	Description
1	3	TX+	Transmit Data (+)
2	6	TX-	Transmit Data (-)
3	1	RD+	Receive Data (+)
4	4	Not used	Not used
5	5	Not used	Not used
6	2	RD-	Receive Data (-)
7	7	Not used	Not used
8	8	Not used	Not used

TECHNICAL ASSISTANCE AND WARRANTY $\quad$ B

This chapter describes how to contact ADC for technical support and warranty service.

TECHNICAL SUPPORT

Technical support is available 24 hours a day, 7 days a week by contacting the ADC Wireline Systems Division Customer Service Engineering Group at one of the following numbers:

- Telephone: 800.638.0031
              714.730.3222

- Fax: 714.832.9924

- Email wsd_support@adc.com

A Customer Service Engineer answers technical assistance calls Monday through Friday between 7:30 AM and 5:30 PM, Pacific Time, excluding holidays. At all other times, an on-duty Customer Service Engineer returns technical assistance calls within 30 minutes.

WORLD WIDE WEB

Avidia product information can be found at *http://www. pairgain.com* using any web browser. To download product manuals from the Customer Site portion of the web page, you need to provide a customer password. If you do not have a password, contact your sales representative.

LIMITED WARRANTY

ADC DSL Systems, Incorporated ("ADC") warrants that, for a period of twelve (12) months from the date of shipment, the hardware portion of its products will be free of material defects and faulty workmanship under normal use. ADC's obligation, under this warranty, is limited to replacing or repairing, at ADC's option, any such hardware product which is returned during the 12-month warranty period per ADC's instructions and which product is confirmed by ADC not to comply with the foregoing warranty.

ADC warrants that, for a period of 90 days from the date of purchase, the software furnished with its products will operate substantially in accordance with the ADC published specifications and documentation for such software. ADC's entire liability for software that does not comply with the foregoing warranty and is reported to ADC during the 90-day warranty period is, at ADC's option, either (a) return of the price paid or (b) repair or replace of the software. ADC also warrants that, for a period of thirty (30) days from the date of purchase, the media on which software is stored will be free from material defects under normal use. ADC will replace defective media at no charge if it is returned to ADC during the 30-day warranty period along with proof of the date of shipment.

The transportation charges for shipment of returned products to ADC will be prepaid by the Buyer. ADC will pay transportation charges for shipment of replacement products to Buyer, unless no trouble is found (NTF), in which case the Buyer will pay transportation charges.

ADC may use reconditioned parts for such repair or replacement. This warranty ***does not*** apply to any product which has been repaired, worked upon, or altered by persons not authorized by ADC or in ADC's sole judgment has been subjected to misuse, accident, fire or other casualty, or operation beyond its design range.

Repaired products have a 90-day warranty, or until the end of the original warranty period—whichever period is greater.

ADC DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ITS PRODUCTS AND ANY ACCOMPANYING WRITTEN MATERIALS. FURTHER, ADC DOES NOT WARRANT THAT SOFTWARE WILL BE FREE FROM BUGS OR THAT ITS USE WILL BE UNINTERRUPTED OR REGARDING THE USE, OR THE RESULTS OF THE USE, OF THE SOFTWARE IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY OR OTHERWISE.

ADVANCE REPLACEMENT

Any product determined by ADC not to comply with the applicable warranty within 30 calendar days from the date of shipment to the Buyer, or as otherwise authorized, are eligible for advance replacement free of charge. A replacement product will be shipped to the Buyer within 24 hours of ADC's receipt of notification from the Buyer.

If products returned to ADC for advance replacement are not received by ADC within 30 calendar days of shipment of the replacement product or if no trouble is found (NTF) as determined by ADC, the Buyer will be responsible for payment of the cost of the replacement product.

BILLING

ADC's repair of products returned for repair, replacement, or credit, whether in warranty or out of warranty, which is found to be damaged due to customer negligence or which has had parts removed will be billed on a time and material basis.

In the event that the returned equipment is not covered by warranty, ADC will contact the customer with the estimated repair or replacement charges and obtain customer disposition of the product if a purchase order has not been provided.

Equipment returned for repair or replacement is subject to a $70 per unit NTF (no trouble found) charge in the event that diagnostic evaluation reveals no evidence of functional failure or physical defects.

RETURNING A PRODUCT

To return equipment to ADC Wireline Systems Division:

1 Locate the number of the purchase order under which the equipment was purchased. You will need to provide this number to ADC Wireline Systems Division Customer Service to obtain a return authorization.

2 Call or write ADC Wireline Systems Division Customer Service to ask for a Return Material Authorization (RMA) number and any additional instructions. Use the telephone number, fax number, or email address listed below:

- Telephone: 800.370.9670

- Fax: 714.832.9923

- Email Address: rma@adc.com

3 Include the following information, in writing, along with the equipment you are returning:

- Company name, address, telephone number, and the name of a person Customer Service can contact regarding this equipment.

- The purchase order number provided to Customer Service when the RMA number was requested.

- A description of the equipment, as well as the number of units that you are returning. Be sure to include the model and part number of each unit.

- The shipping address to which Customer Service should return the repaired equipment.

- The reason for the return:

    - The equipment needs an ECO/ECN upgrade.

    - The equipment is defective.

> **If the equipment is defective, please tell us what you observed just before the equipment malfunctioned. Be as detailed in your description as possible.**

    - If there is another reason for returning the equipment, please let us know so we can determine how best to help you.

4 Pack the equipment in a shipping carton.

5 Write the ADC Wireline Systems Division address and the Return Material Authorization Number you received from Customer Service clearly on the outside of the carton and return to:

ADC Wireline Systems Division
14352 Franklin Ave.
Tustin, CA 92780-7013

Attention: **RMA (Number)**

All shipments are to be returned prepaid. ADC will not accept any collect shipments.

GLOSSARY C

This glossary defines terminology from the perspective of the Megabit Modem 410F and 420F.

10/100BASE-T	The Institute of Electrical and Electronic Engineers (IEEE) 802.3 specification for Ethernet over thin coaxial cable.
ADSL	Asymmetric Digital Subscriber Line is a technology in which data is transferred from the Megabit Modem 410F to the 420F at up to 7.552 Mbps, and transferred from the 420F to the 410F at up to 928 Kbps. ADSL is the implementation of the physical layer for transmission of data.
attenuation	The dissipation of the power of a transmitted signal as it travels over copper wire, measured in decibels (dB).
BER	Bit Error Rate is a measure of transmission quality. The ratio of error bits to the total number of bits transmitted.
bps	bit-per-second is the number of bits transferred during each second of data transmission.
CBR	Constant Bit Rate is a Service Class for the modem. It provides constant bit rate data with a timing relationship between the source and the destination. Also, a traffic class that carries a guaranteed constant bandwidth. Best suited for applications that require fixed bandwidth, such as uncompressed voice, video and circuit emulation. CBR is a Quality of Service class defined by the ATM Forum for ATM networks.
cell	A fixed-length packet. Also, the unit of data transmission used in ATM. Each ATM cell contains a fixed-size frame (53 bytes) consisting of a five-byte header and a 48-byte payload.
community string	A text string required for an SNMP trap to be received by a trap receiver(s). Also, a text string that identifies an SNMP community and is associated with specific access rights (read-only or read/write).
CRC	Cyclic Redundancy Check is a method used to verify the accuracy of data transmission.

DMT Discrete Multi-Tone is a modulation coding for an ADSL line. DMT is the modulation technology used for the Megabit Modem 410F and 420F ADSL.

downstream traffic Communications from the Megabit Modem 410F to the 420F.

encapsulation The inclusion of data in a protocol header prior to transmission, which enables successful data transmission between different protocol networks.

ES Errored Seconds is the seconds during which errors occur that prevent the payload from being corrected.

Ethernet A protocol used for LAN traffic, which has a transfer rate of 10 or 100 Mbps.

flash memory Non-volatile memory that can be erased and reprogrammed.

gateway A device (generally a router) that provides translation services to allow communication between two dissimilar networks.

IP Internet Protocol is a TCP/IP protocol that controls packet transmission.

IP address A 32-bit address used in IP routing. The address consists of four octets separated by decimals. The octets comprise a network section, a subnet section (optional) and a host section.

LAN Local Area Network is a physically connected group of devices between which data transmission occurs at high speeds over relatively short distances.

LLC Logical Link Control is an encapsulation protocol for data that you transmit from the modem over the WAN in RFC 1483 Bridging/Routing mode.

LOF Loss Of Frame is an error indicating that the receiving equipment has lost a frame.

LOS Loss Of Signal is an error indicating that the receiving equipment has lost the signal.

MAC Media Access Control is a physical address associated with a device such as a NIC. For modem configuration, the MAC is used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Used with RFC 1483 Bridging/Routing mode.

margin The noise margin in decibels that the modem must achieve with a BER of 10^{-7} or better to successfully complete initialization.

MIB Management Information Base is a set of variables that define the configuration and status parameters for network management. Network management stations can retrieve information from and write information to an MIB. The Internet Engineering Task Force (IETF) specifies standard MIBS for certain types of devices, ensuring any NMS can manage the devices. Vendors can specify proprietary MIBs for their devices to fit specific needs.

NVRAM   Non-Volatile Random Access Memory is a medium for storing system configuration information, so the information is not lost when the system is reset.

octet   A TCP/IP term indicating eight bits.

PDU   Protocol Data Unit is data as it appears at the interface between a particular sublayer and the sublayer immediately below.

QoS   Quality of Service is the configured traffic parameters that are assigned to a virtual circuit, which specifies how quickly and how accurately data is transferred from the sender to the receiver.

RFC   Request For Comment is a series of notes that contain surveys, measurements, ideas, techniques, and observations, as well as proposed and accepted TCP/IP protocol standards. RFCs are available on the Internet.

RIP   Routing Information Protocol allows routers to update the routing tables automatically (for example, with information such as how many hops between destinations). The version of RIP you select for the connection must match the version supported by the service provider. Versions RIP1 and RIP-1 compatible use for broadcast. Version RIP 2 uses multicast.

SEF   Severely Errored Frames is the incoming signal has at least four consecutive errored framing patterns.

SES   Severely Errored Seconds is the seconds during which more than 2,500 bipolar errors are detected on the line.

SNMP   Simple Network Management Protocol is a protocol that specifies how to send information between a NMS and managed devices on a network. The managed devices run a program called an agent. The agent interprets SNMP request and responds to them. SNMP is used to set device configurations, read device configurations, or read the device status.

Spanning Tree   A bridging protocol that detects and prevents loops from occurring in a system containing multiple bridges.

subnet mask   A type of IP address that allows a site to use a single IP address for multiple physical networks.

TCP   Transmission Control Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Establishes connection with remote user before data transmission.

TCP/IP   Transmission Control Protocol/Internet Protocol is a protocol used for communications between computers over networks and the Internet.

TFTP
Trivial File Transfer Protocol is a protocol used to download card images or other files from an external TFTP server to the NVRAM of any installed cards, or to upload files from an installed card to an external TFTP server.

trap receivers
PCs configured to receive SNMP traps (messages).

traps
Autonomous, interrupt-driven, SNMP messages sent from a managed node to a network management station to indicate that an event has occurred.

UAS
UnAvailable Seconds is the number of seconds during which the line is unavailable.

UBR
Unspecified Bit Rate is an ATM traffic type used for LAN traffic. When network congestion occurs, the data is stored in a buffer until it can be sent.

UDP
User Datagram Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Uses a protocol port number for the destination at the remote location.

upstream traffic
Communications from the Megabit Modem 420F to the 410F.

VCMUX
Virtual Channel Multiplexer-based encapsulation used for networks with large numbers of virtual channels making it practical to carry a single protocol per virtual channel.

VC
Virtual Channel is a logical connection in the ATM network over which ATM cells are transmitted.

WAN
Wide Area Network is a network consisting of nodes located across a large geographical area. Also, the connection between the Megabit Modem 410F and 420F.

INDEX

Numerics

static

    IP routing 71

    route table entries 51

        deleting 51

        entering 51

statistics 57

    ADSL 57

    LAN 59

    WAN 61

statistics menu

    LAN statistics 59

    WAN statistics 61

storage 6

subnet mask description 89

    MIB and trap 72

system

    configuring settings 41

    requirements 6

    troubleshooting 65

system menu

    factory default 39

    reset unit 38

    security administration 46

    set date & time 45

    SNMP parameters 43

    TFTP parameters 42

    update configuration 37

    upgrade software 63

T

technical specifications 75

technical support 81

TFTP

    description 90

    parameters, defining 42

    server 73

time and date 45

transmission rate

    downstream 67

    rate adaptive 68

    upstream 67

trivial file transfer protocol

    See TFTP

troubleshooting 65

U

unpacking modem 5

update configuration 37

upgrading software 63

upstream

    description 90

    transmission rate 67

V

viewing

    ADSL status 57, 58

    LAN statistics 59

    model and software versions 35

    network statistics 59

    WAN statistics 61

W

wall mounting 8

WAN

    configuring 48

    interface specifications 75

    viewing statistics 61

warranty 81

Web browser configuration 30

www.adc.com 81

ADC DSL Systems, Inc.
Corporate Office

14402 Franklin Avenue
Tustin, CA 92780

Tel: 714.832.9922
Fax: 714.832.9924

For Technical Assistance:

800.638.0031
714.730.3222

ISO 9001

DNV

DNV Certification, Inc.
Certificated Firm

1150055 Rev A